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HINDU MUSIC.

Śaṅkara-moḥana Thākura

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HINDU MUSIC.

THE HINDOO PATRIOT of the 15th September last contained a criticism on Mr. C. B. Clarke's report on Hindu Music, embodied in a letter, dated the 17th May 1873, and addressed to the Director of Public Instruction. After an interval of about eight months Mr. Clarke thought fit to answer that criticism in an essay in the *Calcutta Review*, and it gave rise to a learned and interesting controversy, in the columns of the *Indian Observer*, between Mr. Aldis, Principal of the *Martiniere*, an accomplished critic, and Mr. Clarke. The controversy has closed only lately. Other papers have also had their say on the subject. We watched with interest the current of criticism on Mr. Clarke's essay, and now that all parties have apparently exhausted themselves on the subject, we may, we think, with propriety, say a few words in reply to the author of the report, who has provoked this war of words. We are sorry to perceive that he still persists in his original misconception of the real character of Hindu Music; that he supports his errors by committing fresh errors; and that the more he proceeds the more he involves himself in a maze of hopeless delusions. His mathematicism has proved a snare for himself in his attempt to unweave the web of Hindu Music. We believe he is a searcher after truth, and if he will in a kindly spirit accept the light which we, in all humility, offer to him, he may yet find out that priceless treasure. We will now proceed to an examination of Mr. Clarke's critical dissertation.

At first sight it would seem as if Mr. Clarke's chief object in writing the essay was to mystify the subject by enveloping it in a cloud of mathematicism. But no one is better aware than

himself that mathematics is no more indispensable for one to be a musician than it is indispensable for him to be a painter or statuary. In learning music the student requires, above all things, an educated ear capable of detecting and feeling the sense of all tonal combinations. The susceptibility of an art being examined by mathematical tests is something different from mathematics being indispensable to its comprehension or acquisition. Principles of music embodied into scientific theories may be based on mathematics, but it does not necessarily follow that one must know mathematics in order to understand those principles. We may say without fear of contradiction that those principles which go to form the science of Acoustics enter fully into Hindu Music. But that science in its improved form is still incomplete and imperfect. "The state of our knowledge of Acoustics," justly observes Professor Graham, "one of the most subtle and difficult of sciences, is still too incomplete to permit of the formation of a perfect theory of music." There is nothing to make us regret that the principles of Acoustics, as they exhibit themselves in our music differ in form from the European system. We shall have occasion to shew as we proceed that the science of Acoustics, as it exists among the Hindus, is quite sufficient for all purposes as regards the application of its principles to music. Mr. Clarke, we hope, will permit us to produce the testimony of eminent European professors of music to prove that mathematics, instead of contributing to the exposition and development of music, does much to mystify and obscure it. Dr. Weber says, "I must vindicate myself on the allegation, that, according to the foregoing division, harmonial acoustics, and in particular the mathematical doctrine of intervals, is not mentioned as a part, much less as the basis, of the doctrine of musical composition. For, most teachers of musical composition imagine that the theory of musical composition must necessarily be founded on harmonic acoustics, and, on this account commence their books of instruction with arithmetical and alge-

raic problems and formulas. But this seems to me, calling it by its proper name, nothing else than a mass of empty vagaries and an unseasonable retailing of erudition,—pedantry. For, one may be the profoundest musical composer, the greatest contrapuntist; one may be a Mozart or a Haydn, a Bach or a Palestrina, without knowing that a tone is to its fifth as 2 to 3; and it is, in my honest conviction, a mistake of teachers of musical composition, betraying a decided want of understanding of the subject, to mix, as they do, with the doctrine of musical composition, such demonstrations by fractions, powers, roots and equations, and other mathematical formulas, from which to proceed in teaching the theory of musical composition. To me it appears just as it would be for one to commence a course of instruction in painting, with the theory of light and colors, of straight and curved lines; musical instruction, with the study of harmony; and instruction in language, with the philosophy of speech; or, to demonstrate the principles of grammar to a child, in order to teach him to say—papa and mamma.” Dr. Marx’s observation on mathematics in relation to music are more pointed. He says, “our object, however, is not to calculate, but freely to invent; and this requires no mathematical calculations but a higher faculty which enables us to detect and feel the sense of the different tonal combinations; and, therefore, might be called artistic consciousness.” The great Aristoxinas takes the same view, forcibly enforces the same doctrine and will not allow either reason or mathematics to have any share in the arrangement of the intervals. He thought sense the only judge. He therefore determined the 4th, 5th and 8th by the ear, and the difference of the 4th and the 5th found out the interval of the tone.

Professor Graham, in his essay on the theory and practice of musical composition, while dwelling upon the injurious effect of mathematics on music, says,—“In Italy we may hear persons who who cannot read music, singing very agreeably in two, or three, or four parts, in harmony. Do such persons know any thing of the

harmonic ratios of the sounds they combine together in this way ? They have no more idea that even an octave is in the ratio of 1:2, than they have of the distance between the earth and the moon. Similar false applications of mathematics have tended greatly to produce that mysterious obscurity which has hitherto been artificially thrown over the beautiful and inviting regions of musical melody and harmony."

But it is not necessary to go so far as Italy. The truth contained in the above extract is of universal application, and may be perceived in all countries in the fact that the greatest musicians and the most tasteful composers did not pretend to a knowledge of mathematics. Who amongst the students of oriental music is ignorant of the names of MIRJA BULL-BULL of Persia, AKHWAL-U-SOB-BHA and NICOMACHUS of Arabia, HERMES TRISMEGISTUS of Egypt, the great CONFUCIUS and CHAONG of China, OSMAN EFIENDI of Turkey, ASAPH of the Hebrews, THAN SEN, AMEER KHUSRU, NAYAKA GOPAL, HURIDAS SWAMI, and RAJA MAN, HABA, HUH, SARANGADEVA, NARADA, BHARAT, and NARAYANADEVA of India ? and yet who will venture to say that any one of them was a mathematician ? The extracts we have given, we hope, will prove sufficiently the futility of Mr. Clarke's infallible test of mathematics.

We admire Mr. Clarke's boldness in venturing upon a discussion on the merits of Hindu Music with, as it appears, scarcely any knowledge of its elementary principles. He has no knowledge of Sanskrit, and is but very imperfectly acquainted with Bengali. He had recourse to a native guide, who seems to be equally ignorant of the Sanskrit language as of the musical literature of his country. And the result is that the critic is made to betray his ignorance of the simplest things in our musical system, such as the term Raga and the number of Ragas in use, of the construction of the Sitara and its capacity, though it is the simplest and the most popular of Hindu musical instruments. He attacks the Srooties which he does not evidently understand, though they form the very base-work of the musical system

of the Hindus. That we are not wrong in our estimate of the critic's knowledge of the subject of his criticism will be perceived as we examine his theories one by one.

First as regards his views of Raga in Hindu Music. In saying "there are 36 modes in use amongst the Hindus" he evidently supposes that Raga and Mode are synonymous. Let us see how Danneley defines the term "mode." "A mode," he says, "or a scale is called major, when its third diatonic note is composed of four chromatic degrees; or is the fifth diatonic—chromatic note of the scale, called also the major third; as, C—natural, E—natural, C—sharp, E—sharp &c. A mode or scale is said to be minor when the third note, called the minor third, is composed of but three chromatic degrees; as C E—flat D F—natural; in opposition to major, the third note of which is composed of four chromatic degrees." Let us again see what view Captain Willard takes of Raga in Hindu Music :—

"Mode in the language of the musicians of this country (India) is, in my opinion, termed *Thát* and not Raga or Raginee." "The word mode," he continues, "may be taken in two different significations—the one implying manner of style, and the other of key; and, strictly speaking, this latter is the sense in which it is usually understood in music." Neither is tune Raga as has been apparently construed by our critic in the following :—

"It is true that a European melody written in the fundamental mode can introduce and sometimes will introduce all the twelve notes in the octave, whereas the Hindoo tunes cannot."

We will again quote Willard. "It is true," he says, "that a Raginee (or Raga) is not to be considered exactly in the same situation as a tune is amongst us. It is not strictly a tune according to the acceptation of the word."

Tune and Raga are thus so distinct from each other that one cannot be used for the other without a confusion of ideas. Raga is not joined by regular and symmetrical forms, and may not terminate in the same key as the tune. Moreover, one Raga may be

multiplied into innumerable tunes when its *angas*, namely *bibadi*, *anubadi*, *sambadi*, *graha*, *nyasa*, &c., are so arranged as to follow each other in regular succession. Again, Raga is not divided by a *bivajika-rekha* or bars, as the tune is. The truth is the English language has not a corresponding term for the Raga. To express it by the term Mode would be nearly as accurate as to express the idea of quinine by the word *chiretta* in Bengali. How could *chiretta* be translated into English or quinine into Bengali when there is no term for *chiretta* in English and no term for quinine in Bengali? In the same way there is no equivalent term for Raga in English, nor one for *mode* in Bengali. The idea which the word Raga conveys has not its counterpart in English.

To enable Mr. Clarke to form a correct idea of the term Raga, and to prevent his confounding it with Mode we beg to recommend for his perusal such learned treatises as Raga-Bibodha, Rag-Surbavaswa Sara, Raganarba &c.

As we have observed above our critic has not only no idea of Raga, but he is also ignorant of the number of its varieties. In one part of his essay he says, "Hindu Music, which employs 36 modes &c." If he attempts to give a *saragram* of all the 36 modes he refers to, he will perceive the distinction between mode and Raga. He would have, however, avoided the mistake into which he has fallen if his researches on the subject had extended a little beyond hearsay. The following stanza will occur to the most superficial enquirer who has but a rudimentary knowledge of the literature of Hindu Music :

সঙ্গীতমারভৎ কৃষ্ণে মুরলীনাদমোহিতঃ ।

গোপীভির্গীতমারব্ধমেকৈকং কৃষ্ণসন্নিধৌ ॥

তেন জাতানি রাগাণাং সহস্রাণি চ ষোড়শ ।

নারদ সংবাদ ।

"KRISHNA, enchanted by the music of his flute ; began singing, and the GOPIKAS (sixteen thousands in number) followed him one by one, and thus are produced sixteen thousand Ragas."

Narada Sambada I. Chapter.

Again, our critic says, “ If (Bengali Music) employs also seven notes only of the octave in simple tune and nine in more elaborate ones &c.”

The confidence with which the above lines are written is in keeping with his general knowledge of Hindu Music. To whom is he indebted for that invaluable morsel of truth that Bengali music employs nine notes in elaborate tunes? We would take the liberty to commend him to the following lines which occur in all respectable Sanskrit works on music :

ওড়বঃ পঞ্চাভঃ প্রোক্তঃ স্রৈঃ ষড়্ ভিশ্চ ষাড়বঃ ।

সম্পূর্ণঃ সপ্ত ভিজ্যেয় এবং রাগাস্ত্রিধা মতাঃ ॥

সঙ্গীত দর্পণ ।

“ There are three classes of Ragas (in Hindu Music) : that class which is produced by a grama consisting of five tones is called *odava*, and that produced by a grama of six tones is called *shadava* while the third one produced by a grama of seven tones is called *sampurna*.”

Sangit Durpana.

It may be observed here in passing that the diatonic scale which Mr. Clarke has used for our ষড়্ভুজ grama is a wrong, diatonic scale somewhat resemble the *saptaka* but not quite.

After giving a very short and meagre description of the Sitara, the simplest and the most popular musical instrument in use amongst the natives of this country, he says :

“ But the frets (of the Sitara) are then inconveniently close together.” It would be difficult to obviate objections in a case which depends upon practice. What may appear inconvenient to any other person may be one of the easiest musical feats to a practised player. We, for our part, shall be very happy to demonstrate this practically if our critic wants a practical demonstration. We do not know on what authority he ventures to make the statement that “ the Sitara cannot play D flat.” Any body can do it. We find no difficulty in playing

it with Murchhana and can practically shew it without displacing the frets. Here again is another illustration of the mischief of hearsay knowledge. There would have been no chance of mistake if statements had been made on the authority of an expert or of one who possessed some practical knowledge. Mr. Clarke in another place, says "Hindu Music employs melody only without harmony." This is a very unqualified assertion. It is true that Hindu Music abounds in melody, but it is not void of harmony. The following quotation from NARADA's work will best explain our meaning :—

গানস্য দশবিধ গুণবৃত্তিস্তদ্যথা, রক্তং পূর্ণমলঙ্কৃতং
প্রসন্নং ব্যক্তং বিক্ৰুতং শ্লক্ষ্ণং সমং সুকুমারং মধুর—
মিতি গুণাঃ । তত্র রক্তং নাম বেণুবীণাদি-স্বরানা—
মেকীবে রক্তমিত্যুচ্যতে ।

There are ten kinds of properties of a song, these are

রক্তং পূর্ণমলঙ্কৃতং প্রসন্নং ব্যক্তং বিক্ৰুতং শ্লক্ষ্ণং সমং
সুকুমারং মধুরম্

but all of them are not to our present purpose ; রক্তং (Ruktang) only serves our purpose well, and its definition is as follows : রক্তং (Ruktang) is that which is produced by a combination of the sounds of all stringed instruments, wind-instruments, and those of other kinds.

This is harmony. *Vide* সঙ্গীত দর্পণ and অদ্ভুত রামায়ণ ।

The disadvantage of writing with an imperfect knowledge of his subject has betrayed the critic into absurd blunders at almost every step. We have another instance in the following extract :

"The Sitara thus stands in the mode; and can be made to stand in any one of the thirty-six modes employed in Hindu Music. This connection between the Sitara and the modes in use, renders it certain that either the modes are derived from the Sitara or that the Sitara has been invented to play those particular modes. This latter seems to me highly improbable."

It is impossible to have two opinions on a point which does not admit of a doubt. To say that the Ragas were derived from the Sitara would be as much as to say that the goose was produced from the quill. The Sitara is an instrument of yesterday's invention. It was, according to Captain Willard, invented by AMEER KHUSROO in the beginning of the 12th century. Even the Vina, the most ancient of the Hindu instruments of music, of which the modern Sitara is a clumsy imitation, was invented by the great NARODA long after the Ragas had been practised on the throat. That this most ancient instrument, whose invention is almost coeval with the origin of Hindu Music, did not precede but of followed the Ragas will appear from the following extracts familiar to every student of Sanskrit music :

রাগাঃ কণ্ঠগতাঃ স্মৃতাঃ

“ The Ragas are known to be located in the throat.”

Ergo they are not derived from the Sitara or any other instrument.

দারবী গাত্রবীণা চ দ্বৈ বীণে গানজাতিষু ।
সামগী গাত্রবীণা তু তস্যাঃ শৃণুত লক্ষণং ॥
গাত্রবীণা তুমা প্রোক্তা যস্যাং গায়ন্তি সামগীঃ ।
স্বরব্যঞ্জনসংযুক্তা তস্যা দাক্ষিণির্মিতা ॥

There are two kinds of Vina in music, namely, দারবী (Daravi) or that which is made of wood and গাত্রবীণা (Gatravina) or that which is to be found in the human body. Now গাত্রবীণা (gatravina) is called Samagi because the *Sama-Veda* singers wholly depended upon this Vina in singing hymns from the *Sama-Veda*. It is capable of producing both tones and articulate sounds. Daravina, which is made of wood, is an imitation of the Gatravina.

নিবিশ্য দৃষ্টিং হস্তাগ্রে শাস্ত্রার্থমবুচিত্তরন ।
সমযুচ্চারয়েদ্বাক্যং হস্তেন চ মুখেন চ ॥
যথৈবোচ্চারয়েদ্ বর্ণাংস্তথৈবৈবাহ সমাপয়েৎ ।

নারদীরশিক্ষা ।

“ Looking at the fingers and following the directions of the Sastras the words should at once be sounded both by the mouth and by the hand.”

Again :—

হুতাং বাদ্যানুগং প্রোক্তং বাদ্যং গীতানুবর্তি চ ।

অতো গীতং প্রধানত্বাদব্রাদাবভিধীয়তে ॥

সঙ্গীত নারায়ণ ।

“ Dancing follows instrumental music, and music follows singing ; hence singing being of prime importance it should here be first explained.”

It is thus clear that the Ragas were neither derived from the Sitara nor from the Vina.

Mr. Clarke in a kind condescending style reproves us for our obstinacy in maintaining that C sharp is the same as D flat. His words are :—

“ Probably my Bengali friends will be surprised to hear that C sharp is never the same as D flat that in the instruments like violin that can be stopped anywhere &c.” We forbear urging any thing in defence of our position. If we have erred we have erred with the safest authorities on the subject. What Dr. Adolph Bernhard Marx, Professor of Music at the University of Berlin, says on this point, will, we suppose, be accepted as a conclusive settler of the dispute. “ The attentive student,” he states, “ will however soon observe that two keys have each two different names and that *c flat* is the same as *b* and *f flat* is the same as *e*. Such sounds which only differ in name but are indeed the same (as regards pitch) are termed Enharmonic Sounds. Thus *b* and *c flat*, *e* and *f flat*, *b sharp* and *c*, *c sharp* and *d flat*, *a flat* and *g sharp* are enharmonic sounds or notes. It may at first appear strange that each sound should thus have two different names ; and the student may be inclined to ask why not call the black keys always *c sharp d sharp* &c., &c., or *d flat e flat* &c., &c. Why is *e* to be called

sometimes *f flat* and sometimes *f sharp*. For this apparent superfluity of names there are very good reasons ; they are indispensable for the sake of clearness and precision in musical notation, but their necessity will more fully appear in the study of the theory and practice of musical composition."

Again, the critic asks, "if there is no difference between G sharp and A flat, why have European musicians permitted in using two for one and the same thing?" The reply is a simple one, and a reference to Mr. John Hullah's work would have saved him the trouble of this enquiry. The words of Mr. Hullah are that they "are used for transposition, modulation, minor scale and chromatic scales." In Sanskrit they are used to mark the ascending and descending of a scale.

We are free to confess that we made the assertion, which is disputed, not on the authority of Sanskrit works, but from what we observed in English music. As Dr. Weber states:—

"When must a tone be written as the elevation of a lower one, and when as the elevation of a higher one? This is a point to which we have not yet attended. For the present it is sufficient to know that sometimes the one takes place, and sometimes the other, just according to the different relations under which the tone occurs."

Again :

"It may however be further observed in respect to this matter that such a tone should not properly sound so high in the first case as in the second, e. g. the key between C and D, when it occurs as C sharp it is not quite so high as when it appears as D flat, F sharp is not quite so high as G flat, E flat is not so low as D. sharp, E sharp is not quite so high as F, F flat is not quite so low as E, C double sharp is not quite so high as D or E double flat &c; This difference between C sharp and D flat, F sharp and G flat, and the like, is called an *enharmonic difference*; (which we call the difference of Srooties). These differences, however, are

extremely small and thus imperceptible to our ear, and we may with entire propriety and convenience have but one and the same key for all tones differing only enharmonically ; they may also be called *enharmonically parallel tones*. Thus only one and the same key C sharp and D flat, for A sharp and B flat, for C double sharp and D and E double flat &c.

“ Whatever be the bearing of this circumstance in other respects, in one certainly it is very convenient ; for if, instead of the mere twelve keys which we now have within the compass of one octave, we should have a distinct key exclusively for C sharp and another for D flat, &c. one for E and another for F flat, and still another perhaps for D double sharp, &c., our pianofortes must be overloaded with an endless multitude of keys.”

Thus we have been spared the trouble of entering into a vindication of our position, though Dr. Weber's explanations do not appear to us to be quite satisfactory. We hold that there must be difference between G sharp and A flat according to the division by *Srooties*. Mr. Clarke should he admit this theory, must confess to a conversion to our doctrine ; but should he deny the *Srooties* (quarter tones) he will only contradict himself. Any how his statements his apparently professed creed are at variance with each other. All that we say is that he is right only when he admits the *Srooties*.

With regard to our critic's complaints as expressed in the following extracts, we sympathize with him on his want of knowledge of the Sanskrit language in which the theories of the art of music are clearly expounded :

“ My Bengali critics assert that I do not understand what *Srooties* (or very sharp very flat) is in Bengali music. How can I if the *Srooties* are not defined.”

Again :

“ But my Bengali critics while they go on piling heaps of hard terms about *srooty* &c., also omit altogether to

define that of which they say I fail to discover the accurate meaning.”

We are really sorry for our critic. We tried to make the idea of Srooty clear to him by a periphrasis in which the use of hard terms was unavoidable. And any definition that we may attempt will always fall short of his comprehension because of his ignorance of Sanskrit. But we will make another effort. The definitions in Sanskrit as given in *Sangit Ratnavali* are the following :

স্বরূপমাত্রশ্রবণানুদানুরণনাত্মিকা ।

শ্রুতিরিত্যুচ্যতে ভেদাস্তস্য দ্বাবিংশতিৰ্ঘতাঃ ॥

ষড়্জাদিকপরিজ্ঞানং শ্রুতীনাং ফলমেব তৎ ॥

ধ্বনিমঞ্জরী ।

A srooty is formed by the smallest intervals of the sound and is to be perceivable by the ear. It is of twenty-two kinds.

শ্রবণং শ্রুতিঃ

“Every distinct audible sound is a Sruti.”

Again :

———স্বরঃ শ্রুতিসমুদ্ভবাঃ ।

শ্রুতয়ঃ স্থানসমুদ্ভূতাঃ স্থানানি ত্রীণি তত্র হি ।

হৃৎকণ্ঠঃ শির ইত্যাসাং দ্বিগুণাত্মকং তত্র ।

প্রেত্যেকং স্থানমেতচ্চ দ্বাবিংশতিবিধং ভবেৎ ।

হৃদ্যুর্দ্ধনাভিকালগ্না নাডো দ্বাবিংশতিঃ শুভাঃ ।

“It is a srooty because it is to be heard by the ear. Tones are produced by srooties, and the places from which srooties arise are three in number viz. heart, throat and head.”

তাশ্চ বক্রাস্থখোদ্ধস্থা ধ্বনিতা মকতাহতাঃ ।

“To every one of these three places there are twenty-two strings attached, and from them when struck by the wind the srooties are

produced and these srooties in every place rise successively higher and higher ; *i. e.* those of the throat are of higher tone than those of the heart and so on.

The critic's failure to understand the term srooty has led him to a curious blunder in his attempt to give a division of the srooties in the Hindu Swaragrama ; this will appear from the following passage :

“The tone from G to A is divided into three srooties and the tone from A to B into two srooties.”

The truth is, within the interval from G to A which corresponds to our প to ধ we have four srooties, and in that from A to B which corresponds to ধ to নি three srooties, as the following couplet from Sungit Narayana which is borne out by similar authorities in other Sanskrit books, will prove :

চতস্রঃ পঞ্চমে ষড়্ভ্জে মধ্যমে স্রুতয়ো মতাঃ ।

ঋষভে ধৈবতে তিস্রো হে গান্ধারে নিষাদকে ॥

“There are four srooties in পঞ্চম, ষড়্ভ্জ and মধ্যম or G, C, F, three in ঋষভ and ধৈবত or D, A, and two in গান্ধার and নিষাদ or E, and B.”

We also find the following passages on the point in Carl Engel :
“Smaller intervals than semi-tones are in use with some Asiatic nations, and were employed by the Hindus long before our Christian era.”

Further,

“The seven intervals of the Hindu scale which nearly correspond with our diatonic major scale, are subdivided into twenty-two srooties corresponding to quarter-tones.”

Mr. Clarke finds fault with us for using the term quarter-tone for Srooty. We owe him some explanation. We used the word in the absence of a better one, though we are fully aware that a quarter-tone is not a Srooty. The term is used in all English

works where it is intended to convey the idea of a Srooty, and we thought that Mr. Clarke would have no difficulty in understanding it if similarly used by us. In English there are no corresponding terms for Srooty, Raga, Murchhana, Tala and several other words commonly used in Hindu Music, and in employing any one of them in an English composition on music the choice of words conveying an approximate meaning is unavoidable, and in such a case the writer cannot be said to misuse words except by the hypercritical.

Then Mr. Clarke puts the following query; "I therefore ask what is a Srooty, is it a quarter-tone as my opponents usually denominate it: or is it sometimes a quarter-tone—sometimes third of a tone?" We reply that a srooty is sometimes a quarter-tone and sometimes the third of a tone. There are four srooties between ষড়্জ and ঋষভ and therefore each Srooty between these two tones is a quarter-tone. Similarly there are three srooties between ঋষভ and গান্ধার and here each Srooty is the third of a tone. To prevent misconception it is necessary to add that except in the definite places pointed out there cannot be a quarter-tone and third of a tone in any and every place. As to our critic's dogmatical conclusion that "if the latter alternative (the third of a tone) is selected I think it may be demonstrated that music on such a scale is impossible." We have just proved that when a Srooty is the third of a tone between ঋ and গ it is quite in place and the tone is perfectly musical—nobody has yet questioned that the tone between ঋ and গ is an unmusical one.

To come now to his other queries. He asks, "How many srooties are there between C and G in Tara, the upper octave, and how many between A and B in Mudara, the lower octave? And in answering this question it must be recollected that the distance from C and D or from A to B is the same in every octave." There lies couched in these queries an unconscious mistake, but for which there would have been no occasion for them. Between C and D in the upper octave there are four srooties, and between A and B in

the lower octave three. We shall only remark that there is no difference in number between the three saptakas—the only difference that exists consists in the difference of value. The numbers do not increase in quantity but in quality. We have again recourse to Sungit Rutnavali which says:—

এত তু শ্রুতিভেদাঃ স্মৃতাঃ শ্রবণাৎ শ্রুতিসংজিতাঃ ।

উচ্চোচ্চতাবমাপরাঃ দ্বিগুণাহুত্তরোত্তরং ।

“These are the different kinds of tones. Then these are called Srooties because they are heard and rise higher and highest up in tone (as they pass through the different quarters.)”

The warning given in the last sentence of the extract from the critique is uncalled-for. The distance from C to D (or from A to B) is not the same in every octave, for there are four srooties in the interval between C and D, while there are three only between A and B, and our critic does not, we hope, wish us to say that four is equal to three. We repeat that the different spaces are the same in the three octaves,—they differ from each other only in quality.

Again, he asks—“if between G and A the difference is divided into three srooties, does any one of the srooty intervals coincide with the semi-tones, or do the three srooties divide the interval from G to A into three equal tones?” The question itself is wrong. Between G and A there are not three but four Srooties divided into four equal intervals. This is the truth which all Hindu Musical works teach and which reason approves.

The assurance implied in the following passage is not a little surprising. “It is impossible to challenge any Bengali performer to exhibit the srooties on a Sitara, for there are no frets on the Sitara at the Srooty intervals so that the Srooty can only be performed by flicking the string i. e. altogether uncertainly.”

This is going a little too far to say the least of it. What will the writer do if he has to tune a Raga? Will he flick the string merely or do something else? Will it not be necessary to remove the frets as often and whenever necessary, and tune the srooty so that Raga may come out? His replies to these questions will serve for the explanations he seeks.

Our critic not content with his extravagant and dogmatic opinions makes the following challenge :—

“Can any Bengali singer be produced who can sing the quarter tones between C and D and afterwards the third note between G and A? I will not say produced before me as I am about to pledge myself to a total disbelief in the whole thing but any competent professor of music such as Mr. Frye.”

Security, it is said, is man's chiefest enemy, and this is notably the case with Mr. Clark. The feat he alludes to is neither impracticable nor difficult. One who knows to sing can sing both the quarter-tone and the third note without difficulty. It is done every day by practised singers and has been in use amongst us from remote antiquity. Very distinct allusion is made to the feat in ancient Sanskrit works on music such as Rutnavali, Raga Bibodha and the like from which we make the following extract.

ক্রমাহুচ্চোচ্চতায়ুক্তা বীণাকণ্ঠে তু লক্ষিতাঃ ।

তাঃ স্বরমণ্ডলযন্ত্রাদৌ দর্শয়ন্তি শ্রুশিক্ষিতাঃ ॥

Srooties or enharmonic tones rise higher and highest up in succession perceivable both in Vina or in the stringed instruments and in the throat.

“It is thus clear that the Srooties are both tuned and sung. We shall be very happy to satisfy Mr. Clark not only before Professor Frye but any number of European musicians of the truth of our statement. The difficulty will lie with the challenger himself, who, we may be permitted to say, evidently seems to be incapable of appreciating the Srooties. His disbelief in them, however, does not disprove their existence any more

than the disbelief of a blind man in the existence of colors disprove the colors themselves. Neither can it effect the truth that the Srooties or enharmonic tones have been used and recognised from time immemorial not only in this country but in Greece, Arabia, China, Persia and several other Asiatic countries. Nathan truly observes that the Srooties are extremely musical and they are so called from their superior excellence as a species of music the modulation whereof according to Brossard, proceeds by intervals less than quarter-tones. This species was in great vogue among the Greeks by whom it was considered much easier of execution, but it is now lost. It is evidently of much ancient date as Aristoxinus ascribes the invention to Olympus. Dr. Burney says, that Dr. Russel procured him from Aleppo the Arabian scale of music the octave of which consisted of twenty-four quarter-tones, all of which admitted of the same demonstration as the Srooties. The following extract from Dr. Graham is very much to the point. He says, "as to the Hindu, Persian and Chinese scales and the use of the quarter-tones and other minute intervals we refer the reader to what we published on that subject in No. IV. of the new *Edinburgh Review* for April 1822 p.p. 521-528. We have examined a number of Chinese wind and stringed instruments brought home in June 1837 and have found semi-tones in all of them. Professional musicians who followed Napoleon to Egypt, remarked the frequent and dexterous use of very small intervals by some singers." Can we help inferring that the tones in the instruments referred to were Srooties?

Again Stafford the musical historian says:—"A late traveller assures us that the modern Egyptian performers make use of very minute intervals in singing passages of embellishment with a rapidity and volubility, the imitation of which would be difficult if not impracticable to most European singers." That they are in use among many uncivilized nations will be found in various works of note, from one of which we transcribe the following passage:—

“Even some uncivilized nations possess according to the accounts of the travellers such a discernment of intervals as to surpass our own—Councillor Telinius* informs us that the natives of Nukahiva, the principal island of the Marguisus Archipellego distinctly intone demi semi-tones (quarter tones) in their vocal performances. The New Zealanders appear from Davis’ account to be gifted with a remarkably fine ear for distinguishing quarter tones.”

The Persians appear to have employed at an early period smaller intervals than semi-tones.† In France too a number of experiments were made with Viottis’ performance, and it was ascertained that he employed a vast number of very minute intervals in order to play perfectly tunes in all keys. The Swiss still retain the quarter tones in use.‡

As for the assertion that the Sungit Sara does not contain anything like the theory of music, we will take the liberty to point out that in the book alluded to and in all Sanskrit works on the subject the theoretical part of music is as fully dwelt upon as in any European treatise, only it is not mystified by obscuring mathematicism. As we have said elsewhere we hold that it is quite possible to build a rational theory of music without the aid of numbers. We will again trouble the critic with an extract from a Sanskrit work bearing on the point in question :

আকাশাগ্নিমকজ্জাতো নাভেরুদ্ধং সমুচ্চরন্ ।

মুখেহভিব্যক্তিমায়াতি যঃ স নাদঃ প্রকীর্তিতঃ ॥

আদ্যঃ কারভবো বীণাসম্ভবস্ত দ্বিতীয়কঃ ।

তৃতীয়শ্চাপি বংশ্যাদিসম্ভবঃ স ত্রিধা যতঃ ॥

সঙ্গীতনারায়ণঃ ।

Sound which is first produced by vibration and air within the human body, comes through the mouth and is called নাদ (nada).

* Musical Curiosities by E. Jones.

† Specimens of Popular Poetry in Persian as found in the adventures and in the songs of the people inhabiting the shores of the Caspian Sea by Chodgoh.

‡ C. S. P., 54.

Thus the sound arises first from within the body, secondly it is expressed in the form of words through the mouth, and thirdly by means of instruments. From this নাদ (nada) or sound the whole system of music is evolved.

তত্র প্রথমোদ্ভিস্য গীতস্য বক্ষ্যমাণত্বান্নাদং
 বিনা তদনুপপত্তেঃ প্রথমং তমেবাহ তদ্বক্তং ।
 ন নাদেন বিনা গীতং ন নাদেন বিনা স্বরঃ ।
 ন নাদেন বিনা রাগস্তস্মান্নাদাত্মকং জগদিতি ।

সঙ্গীতনারায়ণঃ ।

And singing is to be explained first, but without নাদ (nada) singing is impossible and therefore sound is the root of all. Without sound singing is impossible, without sound tone is impossible, without sound Raga is impossible, and therefore নাদ (nada) is the all pervading soul of the world.

The origin and nature of this নাদ (nada) is as follows :

আত্মা বিবক্ষমাণোহরং মনঃ প্রেরয়তে মনঃ ।
 দেহস্থং বহির্মাহন্তি স প্রেরয়তি মাকতং ॥
 নকারঃ প্রাণবায়ুঃ স্যাৎ দকারো হব্যবাহনঃ ।
 তাভ্যামুৎপাদ্যতে যস্মান্তস্মান্নাদোহরমুচ্যতে ॥

সঙ্গীতনারায়ণঃ ।

নাদাভ্যং জাতত্বান্নাদ ইত্যর্থ or (ন) vital air or power and (দ) heat or vibration produced by heat originates nada (নাদ) or sound.

Again :

নাদাচ্চ শ্রুতয়ো জাতাস্তাভ্যঃ ষড়্ জাদয়ঃ স্বরাঃ ।
 তেভ্যো রাগঃ সমুৎপন্নো গীতং তস্মাচ্চ জায়তে ॥
 অতো নাদাত্মকং গীতং বাদ্যং গীতানুবর্তি চ ।

From Nada arises srooty, from srooty comes *swara* or tone, and from *swara* comes Raga, and from Raga comes Gita, and therefore the soul of Gita is sound. The instrumental music follows Gita.

Hence it is we contend that our scale is natural and is well represented by M. Momigny's doctrine which holds that a true

scale is derived from nature and requires no mathematical calculations.

Our critic observes with some emphasis that the Hindu boatmen whom he heard “employ occasional sharps and flats that could not be played on the Sitara.” Apart from the question of the accuracy of the statement about the boatmen’s songs we will simply dwell on the principle involved in the criticism and say that there is not a single Indian melody with occasional sharps and flats which cannot be played on the Sitara. Let our critic name any melody and we will demonstrate our position.

In extolling the boatmen’s songs as the best and the most approved specimens of Hindu music our critic makes the following remarks.

“I think most Europeans who take the trouble to compare this (boatmen’s song) with the best specimens in Sungit Sara &c., will readily credit my statement in my letter of 17th May 1873 (which appears to have much angered my Bengali critics) *viz.* that “while all Hindoo musicians speak with contempt and almost abhorrence of the boatmen’s songs, I have heard many Europeans declare that the boatmen’s chants are the only music in Bengal that can properly be called music.”

There is such a refined appreciation of musical lore in the above that we know not what to say. But it requires no comment. We grieve to find that our critic drags other Europeans along with him to countenance his own idiosyncrasies. Many we ask how may Europeans understand the language of the boat-man’s song or its so-called musical cadence? All native boatmen do not sing in the same strain and in the same language. In the Eastern districts there are classes of boatmen who may be marked out by broad distinguishing characteristics. Their habits and manners are distinct and their songs are different in strain and language. The boatmen of Noakhally are not like the boatmen of Dacca, and the boatmen of Chittagong are quite unlike the boatmen of Dacca and Noakhally. Again, by far the greater portion of these

boatmen are Mahomedans, who sing songs in Mahomedanized Bengali if we may so express ourselves. Can Mr. Clark distinguish a native boatman as to his nativity by his song and its language? Besides the three large classes of boatmen we have named there are others in East Bengal who are also distinguished by some peculiarities—the boatmen of Sylhet, Backergunge, and Furreedpore for example. Again, the boatmen of West Bengal who navigate the Ganges and its tributaries are quite a distinct class of boatmen from any of the Eastern districts. They sing much better than our critic's friends of East Bengal. They usually come in contact with a larger number of educated and polished gentlemen than any boatmen of East Bengal can ever hope to do, and it may be said the former move in better society. They are therefore expected to be better educated and more civilized than their fellow-laborers in the eastern districts and yet their songs indicate no tunes of musical merit. If there is any thing for which their songs attract notice it is their point and peculiar epigrammatic beauty. But perhaps Mr. Clark had the rare good fortune to fall in with a class of musically educated boatmen. What however surprises us most is that his proteges sang songs Sanscrit. He says :

“ When I had travelling in my boat, Koylash Chunder Sen (Additional Deputy Inspector of Schools in Dacca) I got the boatmen to repeat the words to him. Koylash Chunder told me that the words were Sanscrit, that the boatmen very imperfectly understood them themselves, and gave me some account of the legend of which I took no note.”

It is very difficult to maintain one's gravity in arguing with a person who can be so credulous. Cannot our critic favor us with one or two of the songs which so charmed him? But a few words will suffice. He cannot deny that the popular songs of a nation must be composed in the language spoken by the people. Can he refer to a period when Sanscrit was the spoken language of the masses of Bengal and of East Bengal in particular? Where did the

boatmen learn Sanscrit songs? We know of very few pundits who can recite extempore Sanscrit songs. But the writer betrays himself when he says that "the boatmen often sing very nicely in tune though their voices may be rough and their style uncultured, &c." Ignorant and uneducated people may mispronounce Sanscrit, but if they sing in Sanscrit it cannot be in uncultured style unless the songs be of their own composing. We fear Mr. Clark's short stay in East Bengal has made a *Bangal* of him and we fear that his deputy treated him with a canard.

We now come to the discussion of our critic's remarks on our musical notation, which he condemns by saying "that the nationalist Bengali musical notation is valueless and ought to be superseded at once by the stave." To say the truth we do not very clearly understand the gist of his objection. We may, however, tell him that the Indian notation as far as it goes is all that we require. It is simple, convenient, and sufficient for all practical purposes. What the Europeans express in eleven lines by the great stave of eleven we do the same in three lines only, —the great stave of eleven is arbitrarily divided into two halves as the Europeans use both the hands. We beg Mr. Clark to bear in mind that the notation he condemns is based on the original Sanscrit notation, of which he will find a full exposition by Sir William Jones in the Asiatic Researches; many of the signs and symbols of that notation have now become obsolete or have been entirely lost. What we have done is simply this, we have endeavoured to introduce such improvements in the system as are necessary to adapt it to modern requirements. In the original Sanscrit notation Hindu Music was represented by means of one line with certain signs and symbols and the initials of the seven notes; we now use three lines for three octaves. The reason of this innovation is, that the three octaves being the three natural ones are best represented by three lines, though one line would do and might still be used in the same way as the tonic-sol-fa method of

the Europeans. It will be remembered that the Greeks represented three octaves by three different letters. Now it will be seen that in representing the three octaves the Europeans not only require the stave of five lines but also use many ledger-lines for the notes, or they use the great stave of eleven lines. Now we put it to Mr. Clark to say which is simpler—the stave of three or the stave of eleven, and which would occupy lesser space?

There is a great diversity of opinion among English musicians regarding the stave in use. Nathan in his *History of Music* says :

“In the eighteenth century a staff of four lines was in general use, which may be met with at this period in some of the old church music.”

Again Curwen says,—

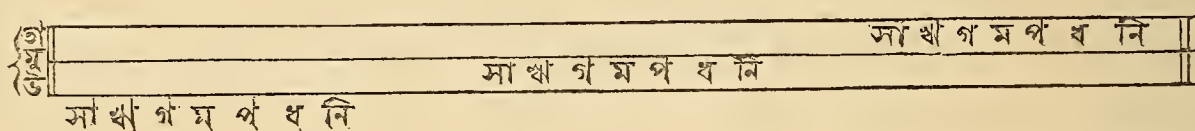
“The old way of “noting” or writing music called the old notation, uses a ladder of five lines and four spaces which is called the “staff.” On this certain marks are placed which represent the tones. “These marks are placed higher or lower on the lines and spaces as the tones are higher or lower in pitch. The difficulty of the old notation to the singer, arises from its not shewing plainly and promptly, which is the key-tone Doh, which the third of the scale Me which is the fourth, Fah &c. For on the perception of key relationship the power of the singer depends. When once the tonic-sol-faist has heard the key-tone and knows that a certain note before him is Ray or Soh &c. he can sing it * * *. But until he sees the key relationship of a tone he is at a loss. No information as to its absolute pitch or its distance in pitch from the last tone sing, apart from key relationship, can supply to him that clear and accurate preconception of the tone to be struck to which he has been accustomed.” To remove this difficulty the author offers some hints the repetition of which in this place is deemed unnecessary. When the staff of five is still imperfect even

English music how can it be sufficient for Hindu

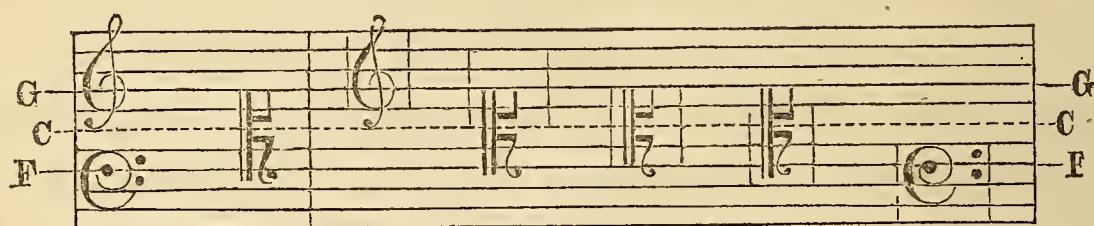
Music which is rich in Ragas and which abounds in Murchhanas, Talas &c.? And yet Mr. Clarke says that the Bengali notation ought at once to be superseded by the English stave.

Every nation that has a music of its own has also its own system of notation for writing it. Whether that system be an advanced one or not it cannot be correctly expressed in the notation of another nation, however improved and scientific it may be. And even in such a case the notation will have to be studied separately. Under such circumstances we do not understand how the introduction of a foreign notation can save us the trouble of learning it. Anglicized as we have become in many respects, we confess we prefer our national system of notation for our national music. The English system of notation, it needs be observed, is imperfect and insufficient for the purposes of Hindu Music for the simple reason that the genius of Hindu Music is distinct from that of European music. We cannot, therefore, subscribe to Mr. Clarke's opinion that "if it was essential to represent quarter-tones, some modification of the stave would be far more preferable to the nationalist notation, and that the common European stave can represent fully the Bengali melodies and ought to be generally adopted." When it is admitted that some modification is necessary for the quarter-tones alone and some more for the Murchhanas and the varieties of Tala &c., we cannot understand with what consistency we are asked to have recourse to a foreign and hybrid notation, in preference to our national system. Indeed, we fail to perceive the force of the *ipsi dixit* that a Bengali who knew no English might play a melody from an English or French piece of music, when it is not denied that he must submit to the difficult task of studying the English stave without knowing the language, and learn the modifying signs not only for the quarter-tones but also for other innumerable varieties of Talas &c., referred to above. It may from this be imagined what a deal of trouble he must undergo in order to understand a single Raga. But why impose

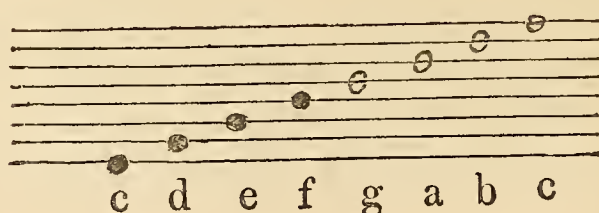
upon him this heavy work when in the three lined Hindu notation—in spite of the signs for Srooties &c., which however are very distinctly marked upon the Swaragrama—he has only to mark the different swaras in their initial order in the three saptakas placed separately each in its proper place, and the whole thing is at the perfect command of the learner? Only three lines mark the three sorts of natural sounds, namely the chest, the throat, and the head sounds. Is not this simple and clear? To give a clearer idea of this we give below a diagram of our Swaragrama of the Saptakas which is so natural and at the same time sufficient for all practical purposes.



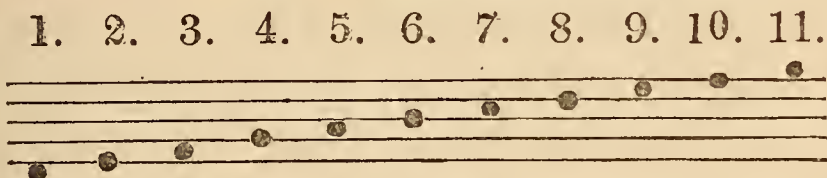
Now mark the contrast in the English notation. Here is a diagram of eleven lines.



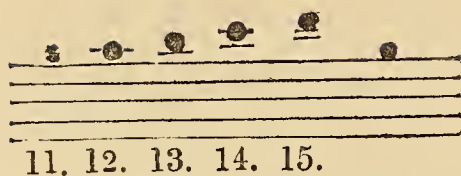
Let us examine, as far as practicable, both the English and the Indian systems of notation from the diagrams given below in order to judge of their comparative merits and of the facilities for comprehension which they respectively afford. We will take the English notation first, and, foreigners as we are, we cannot help remarking that to our understanding it is complicated. In order to express an octave it is required in the European notation to have seven or eight lines or steps indicative of the position of notes that constitute an octave.



Thus upon the lowest of these lines or steps, the lowest note *c* must have been placed; upon the line above it, the next note *d*; upon the third line, the note *e*, and so on. In this case, which however is the most natural, so many lines are necessary that it is next to impossible to perceive at a glance the position of the notes upon them and such will exactly be the case if our Saptakas be required to be expressed according to this system. To remove this inconvenience the number of lines is limited to five and why? Firstly, because an odd number of lines, as Dr. Marx says, has the advantage of an equi-distant middle line, which divides the staff into two equal parts and thereby facilitates its reading. Secondly, because a less number than five, say three lines together, with their spaces do not afford even a sufficient number of spaces for a single octave, while a greater number than five, say seven, will be unnecessary. In order to obtain a sufficient number of degrees, the spaces between the lines above and below them are also employed as places for notes. These five lines together are called a staff, which is now in use among the Europeans. These five lines together with the spaces between below and above them separate places for eleven different notes as will be seen in the next diagram drawn below :



Here the note representing the lowest sound has the lowest place below the first line while that representing the highest sound is placed above the last or fifth line. But the insufficiency of this system for the purposes of Hindu Music is at once apparent. As the ledger lines usually drawn are no more than the long ones then five-lines staff is altogether insufficient even for English music. The ledger lines, however, are thus used for the purpose of representing the notes above the 11th as shewn here :

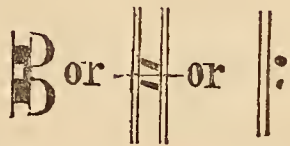


Recourse is had to the same expedient when the lower sounds are required to be noted. Thus there will be no end of such lines, and how complicated and cumbrous it would look when our Saptakas are noted with the Srooties and the different varieties of Talas. For besides the swaras, for which an almost infinite number of ledger lines will have to be drawn, there must also be used numberless different signs to represent the Srooties &c. along with the signs for the different clefs. Yet we have not done, we must know what sound is really represented by a note standing upon a certain line or space. For these various purposes they remove the notes as it is impossible for them from the nature of the staff to have a fixed position. For instance, if it had been determined that the first line of the staff in the last example quoted above should be the place for one lined c, then we should at once know that the note on the first space must be d, on the second line e and that below the first line be small b; for the notes follow each other in the same order as the sounds themselves. But it is obvious that if one more note than one lined e were to be placed on the first line, all the other notes would change their places. If, for instance, e instead of c were to occupy the first line, then the notes d and f would stand below and above it, and g would have its place on the second line. This is indeed a complicated and confounding method. The situation of a note must be definitely fixed if the object be to determine the respective places of the rest. The English musicians use for this purpose certain signs called clefs, which have been introduced to point out a certain line as the fixed place of a certain note. Of such clefs there are

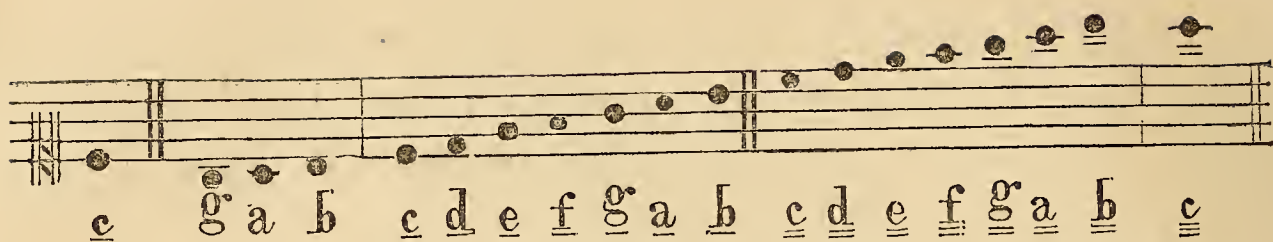
at present in use three and there may be more in future. These three are first G or treble clef, some times called the violin clef, the C clef, and the F or bass clef. The form of G or treble clef is as shewn below :



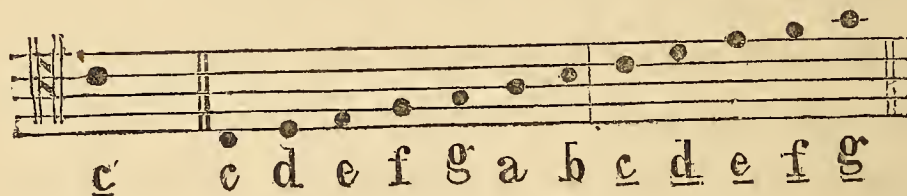
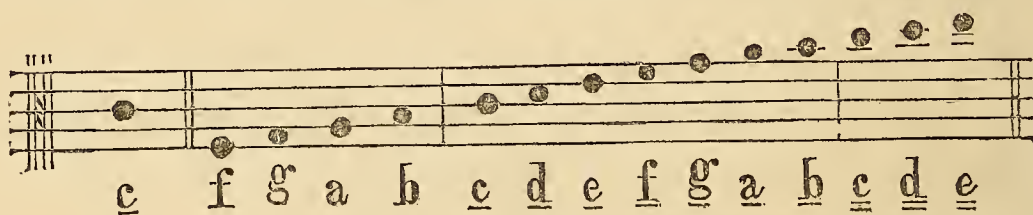
If we required to note in this clef the small *f*, we should have to place it upon a third ledger line below the staff, the three-lined *a* would have its situation over the fourth ledger line above the staff and so on. Here the English musicians use *g* as the first note, which would be impossible in our Swaragrama. For G corresponds to our प, and प cannot form the base or the first note of the षड्जादि स्रष्ट. षड्ज according to the Sanskrit authorities is always to be taken as the first. Further, we do not understand why they have used here G instead of C, which is the recognized fundamental note, and this C they use on the ledger line. Again, the first note must, as a matter of course, occupy the first line, but the *g*, although taken here as the first note, must stand on the second line. Altogether this is a complex method for us to understand, however plain it may appear to Europeans. Moreover in the first diagram drawn above it is shewn that *e* takes the first line, and therefore *e* naturally forms the clef. But in reality it does not do so. Formerly in France they used G as the first note and upon the first line ; but we do not know why they have changed its position. The C clef shows, that the line which it occupies is the fixed place of one-lined *c*. It occurs in this form :



And this again is employed in three different ways, as canto, alto, and tenor clefs. The canto clef places one-lined *c* upon the first line. Here is a table of its notation.



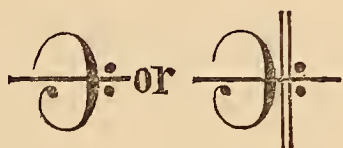
This table may be extended by means of ledger lines below or above the staff, according to the preceding directions. The alto clef places the one lined c upon the third line, and the tenor clef places the one lined c upon the fourth line. But in the former case the F will be on the first line, which corresponds to our ষড়্জ, and in the latter case e will be on the first line, which corresponds to গান্ধার, therefore the two are inapplicable to our ষড়্জ. Of the annexed two diagrams the first represents the sounds of the notes of alto clef and the second represents the notes of the tenor clef.



These are the three ways in which the C clef is now employed. The ancients used it in the second also, and we cannot account for the modern alteration, neither do we understand which of the three clefs is now used. It may be asked why the first canto clef is inapplicable to Hindu Music, since the one-lined c may stand for ষড়্জ; the answer is that the one lined c corresponds to ষড়্জ, not in the উদার or the lowest Saptaka, but in the স্বরিত or মুদার Saptaka. In Hindu music, whether vocal or instrumental, we commence our grama from the lowest or the উদার সপ্তক. But the discant or canto is the highest of the four principal voices. Here we may observe in passing that in noting our three octaves, which are natural, when divided and sub-divided as in the European music, an endless number of ledger lines must be used. And

will the innovation be an improvement upon our system? Supposing it were, it would change the character of Hindu Music, which does not admit of any minute divisions and sub-divisions.

We now come to the third clef, F or Bass clef which is represented in the form here shown and indicates that the line which it encircles is a seat of small f.



In modern music it always occupies three-fourth line and the remaining lines and spaces are named thus :

Contra Great.



When it is required to extend its range, it is found insufficient, and innumerable additional ledger lines have to be drawn. Thus contra G being situated below the third ledger line they require an additional ledger line for the notation of contra F; above the staff, a third ledger line must be drawn for one-lined g, a fourth for b and so on. In old English music, however, we occasionally meet with Bass clef upon the third line, and also upon the fifth. Thus there has been a change already, and we know not how many more might take place in future. These are the clefs—but what is the use of so many clefs? Will not the numerous gradations of clefs in use prove perplexing and misleading? Will not one be sufficient as Weber says, “indeed we might employ only a single line.” To this perhaps it might be urged that the use of one clef would necessitate the multiplication of ledger lines both below and above the staff, as in the Bass clef; for example, two ledger lines are required for one-lined e; five

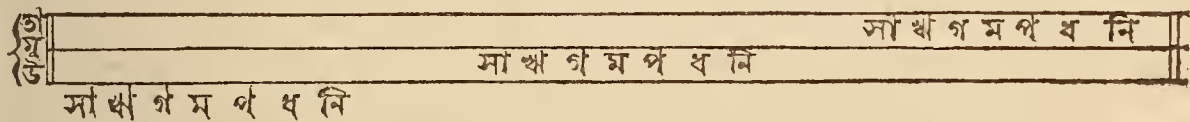
ledger lines for two lined *c* and perhaps not less than nine ledger lines for three lined *c*, all which is avoided by the use of the clefs. Admitting the explanation to be reasonable, why have the Europeans then in modern music discarded not only the G clef upon the first line, but also the C clef upon the second line, and F clef upon the third and fifth lines—and according to many the reduction is just. Really all this is a puzzle to us—is this the system which is to solve our difficulties ?

All these divisions and sub-divisions together with so many clefs and varieties of lined notes have been derived from the great stave of eleven, and, notwithstanding all these innovations and modifications, they cannot, as Dr. Weber remarks, represent more than three octaves originally noted down in the simplest forms of the stave of eleven lines. Again, the English musicians, divide this stave into two equal parts, the reason of which is inexplicable to us. Perhaps it is done in order that the performer on a pianoforte might use both the hands or it may be for male and female voices being used in harmony. But all that we say is mere guess—the correct explanation may be best furnished by Europeans. But whatever the reason no such division is admissible in Hindu Music in which the melody requires that the series of tones should come in succession; nor have we any instrument like the pianoforte which to be tuned requires two hands for two kinds of tones at one and the same time. From the above explanations it will be evident how complicated Hindu Music will become if noted after the European fashion, while the contrast will be remarkably favorable to our national system of notation.

We will now enter upon the examination of the Hindu system of notation. In the English notation of which we have furnished but a rough sketch, the lines used are in proportion to the number of tones in an octave, which are eight; sometimes so many as eleven or twelve lines are used, perhaps with the view of making them correspond to the number of strings in a harp or

for other reasons which are unknown to us. In the Hindu system of notation we generally use three lines for the three saptakas in common use amongst us. সা ঞ্চ গ ম প ধ নি, corresponding to C D E F G A B, are the seven notes which together constitute a saptaka. There may be more than three saptakas in Hindu Music; but they are not in general use. The three lines on which the saptakas are placed indicate by their position three kinds of sounds, viz., উদার, মূদার and তার। We do not require different clefs, nor changes in the situation of our notes for different purposes, as we always make বড়জ the base or the first note of the saptakas: বড়জ or c in European music has its position fixed and permanently settled.

This peculiarity enables us to avoid the introduction of different clefs, the use of numberless ledger lines, and the change of situation of the notes. We have three saptakas in common use, for which only three lines and nothing more are required.



In the foregoing diagram shewing the notation of Hindu Music, the lowest or the first line has the lowest saptaka, and the third or the uppermost line has the highest saptaka. If it were necessary to use more saptakas we could use dots under each note to mark their position, either below the first or above the uppermost line. Thus, if we place one dot under সা on the uppermost line, it will show that it has a place in one saptaka above that line; and if we put a dot under সা on the lowest line it will shew that it has a place in a saptaka next below that line. Similarly two or more dots will represent as many saptakas besides the natural ones either above the uppermost or below the lowest or first line.

This is all that we require for the purpose of forming the basis of our notation, and from all that has been said the reader will form an idea of the simplicity of our notation as contrasted with

that of the Europeans. To guard against misapprehension we must say that our object is not to establish the superiority of the Hindu system over the European, but merely to show that our system as it is, is quite sufficient for all practical purposes, and that the introduction of the European system will not be an improvement. We will here add that if we have recourse to the division of scale by means of clefs one line for each saptaka will be sufficient. From what has been said of the notations of different nations it will be remarked that each nation, for the complete representation of the differences of their music, must use different signs. If the Europeans use lesser number of signs than what we require, it is simply because they have to do with harmony, while we, for the sake of melody, must use a variety of signs to represent Srooties, Murchhanas, Talas &c. So our notation, as we have shewn, is adapted to our requirements, and is both simpler and easier of comprehension, than the English; while it dispenses with the necessity of adopting the stave. We cannot, however, give our assent to the view of Mr. Clarke's so-called progressive party, that "by adopting, if possible, the European stave for the representation of Bengali melodies, the Bengali musicians of course would save themselves the labor of learning one notation more," that "a Bengali who knew no English might play a melody from an English or French piece of music." For this dissent we have the best of reasons. In the European notation we cannot use all the signs necessary for the full representation of our music without making it indistinct and cumbrous. Some of the signs we refer to are *Bikshep* and *Prokshep*, which are in frequent use in vocal music; the varieties of *Krinthanas*, such as *Murchhanna-krinthana*, *Spursha-krinthan*, *Gamaka-krinthana*, *Ash-krinthana* &c., the varieties of *Chares* or অক্ষর which are of very frequent use in our Vina-Sitara, and the sign known by the name of ঝাঝ in the Mahomedan instruments; the Rabob, the Sarode &c., in several strings used in various ways which greatly contribute to the grace and ornamentation of our music; the *Spursha*,

the variety of *Ash*, such as *Gomaka-ash*, *Murehhanna-ash* &c. These and several others are not represented in the notation of the so-called progressive party, and their not representing them does not make the representation the less necessary, if for nothing else at least for the preservation of the integrity of our system music. They may ignore them, but we are prepared practically to prove their existence whenever we may be called upon to do so. Again, that which we hold to be the very foundation-stone of Hindu Music, we mean the Srooties, or the quarter-tones of the Europeans, in which Mr. Clarke has pledged his disbelief, and in expressing which we take a special pride, find no place in the system of the misnamed progressive party, who are victims of self-practised delusions. All these signs when mentioned in the Sanskrit works on music must be expressed either vocally or by means of instruments, and if we fail it is plain we are ignorant of the method. The adopted notation of the progressive party, even in its improved state, is still as incomplete as it can possibly be. The numerical signs introduced in it require to be explained for the comprehension of different nations, and so will the several new signs created expressive of the peculiarities of our music, which is distinct from the music of other nations, and that in the languages of those nations. Will it be possible for an Englishman or Frenchman who knows no Bengali to play a melody from a piece of Bengali music as represented by this notation? The signs, moreover, have been differently used for the purpose of representing our music, and how will the Englishman or the Frenchman make them out without special instruction? For instance, they use the sign of *Syom* for the English pause, while this *Shom* is the very starting point in Hindu Music, and is as difficult of comprehension to the European as the Raga. We could point out other anomalies, but what we have already done will suffice.

Above all the notation in question has been formed on the treble clef, but not only one such clef but all the clefs divided as they

are, are quite insufficient for the representation of the Alap of a Raga. The Alapa consists of four divisions,—আহুযী, অন্তরা, সঞ্চারী and আভোগ, and these four divisions together constitute what is called a *Tan* (তান), without which the Raga is incomplete.* It is thus evident that Mr. Clarke's assertion "that if it was essential to represent quarter-tones, some modification of the staff would be far more preferable to the nationalist's notation &c.," is barely an assertion, and does not admit of proof.

We think we have adduced sufficient evidence in this part of our discussion to justify us in pronouncing Mr. Clarke's theory about the adaptation of the English system of notation to the music of all nations as wholly arbitrary. Every civilized nation that has a music of its own has also a system of notation adapted to the peculiarities of that music. If we attempt to replace it by the European system of notation we will be under the necessity of expressing those peculiarities by means of new signs. Take the Chinese music as an illustration. The Chinese have a notation of their own with distinguishing peculiarities. They have adopted nine different characters, which are enumerated in French by DeGuignes as ho, se, y, chang, tche, kung, fan, licon, and an.† There they write in a line downwards. They note down each with a character of their own, and DeGuignes says it is impossible to set them down correctly in the European system of notation. Take again Japan. As far back as the year 1611 the musical lines of the Japanese were pricked.‡ Captain Turner was informed that the Buddhist priests in Thibet had their music written in characters which they studied. Nor are the Egyptians and Hebrews without a contrivance of their own.§ Java and other islands of the

* An account of these divisions will be found in Sir William Jones' Works on Hindu Music, also in Sangit Rutnavali in Sanscrit.

† They have also been translated into English by the Rev. E. W. Style.

‡ Howard Malcolm's Travels in South Eastern Asia.

§ Historical, Technical and Literary Description of Oriental Music and Musical Instruments by Villoteau,

Indian sea possess some kinds of notation quite sufficient for the musical requirements of the different nationalities.* The Burmese and the Siamese appear to have made as great a proficiency in music as any other Asiatic nation. They are naturally very fond of it, and the style of their music is for the most part extremely lively, and may not sound unpleasant to the European ear. Their pieces of music are very numerous. They exhibit as many as hundred and fifty tunes written in their own character.† In Ceylon too, music appears to be cultivated with great ardour. There are pieces of music to be seen in regular notes written in the Pali language. The Turks are not without a system or rules. Their music has not only all the tunes and sounds corresponding to ours, but, possessing quarter-tones, it is very rich in materials, and consequently highly melodious and difficult of reduction to a regular scale even in their national system of notation. The Turkish people play in unison or in octaves, which practice though hostile to harmony in the musical sense of the word, is productive of a grand musical effect, and is very imposing.‡ The Arabs divide their music into two parts—the *telif* (composition) or music considered in its relation to melody, and the *ikaa* (cadence of sounds) or the measured cessation of melody regarding instrumental music only. They have four principal modes from which are derived eight others, and they have also six composite modes formed by union of these. Their manner of noting music is by forming an oblong rectangle divided by seven lines perpendicular to its sides, representing together with the two extreme lines eight intervals. Each of these lines is of a different color, which must be remembered as well the name as the interval. They use in their music smaller intervals than our semi-tones. The notes of their scale (which are designated by the numbers from one to seven—yek, du, si, tschar,

* Opus cit.

† Howard Malcolm.

‡ See The Harmonicon, Vol. II.

peni, schesch, heft, or, as in European music, by the first seven letters of the Alphabet, which are in the Arabic, alif, be, gim, dal, ha, wain, zain,) are subdivided into seventeen one third tones, and in rendering this scale in the European system of notation new signs will have to be invented for the quarter-tones. But from the sixth to the minor seventh a—b flat will be semi-tones, while in their scale only one-third tone &c. Thus, it is impossible to represent Arabic music in the European system of notation, notwithstanding the invention of new signs for quarter-tones.*

The Persian music very much resembles ours. It has also its own notation, the reduction of which to the European scale is as difficult and impracticable as that of ours. Now we leave it to Mr. Clarke to determine the result of representing the music of different nations on the face of the earth by one common notation *i. e.* the European with newly invented signs according to the requirements of each. We fear we must defer the prospect of an universal language of Music till the milleneum arrives. If an attempt be made to adapt the English notation to the music of the different nations it will be necessary, we believe, according to Mr. Clarke's plan to make sub-divisions in order to cover the wants and peculiarities of each nation, but then the result will not be that "a Bengali who knew no English might play a melody from an English or French piece of music." But the difficulty we have just represented is not all. As the different systems of music of different nations are not equally progressive (and some are not at all progressive) the new signs we have referred to will have to be modified, altered or extended according to the stages of progress and development of the original music. We will ask Mr. Clarke to bear in mind how much alteration has European music undergone in the course of the last 500 years, and how much more it is destined to undergo. Had the European system been an immutable or a system, what necessitated John Curwen's modifications (which by the bye closely resembles the ancient Sanscrit

* A Treatise on Arabic Music, translated from the Arabic by Eli Smith.

notation) ? and what guarantee have we that they will stop here ? From what we have already adduced it may now be safely assumed as an established fact that except by the systems of notation invented by them the music of the oriental nations cannot be represented by the European notation. In this opinion we are well supported by Ambros who says that "respecting the national songs which have hitherto been published, it must be observed that in all of them the original character of the music has been greatly altered, if not obliterated, by the arrangement of melodies for the pianoforte, or by the unwarranted addition of accompaniments of some kind. In many instances where the songs are usually performed in unison, they retain when harmonized but faint traces of their former characteristics. Even in instances where an accompaniment originally exists, its peculiarities are often so entirely disregarded in the arrangement that it becomes almost another composition." And as to the inapplicability of the European notation what has been said of the music of other oriental nations is equally true of Hindu Music. The difficulty of adopting the foreign notation arises as much from the modifications necessary for the quater-tones, as for various other causes too intricate for enumeration. We will cite a few more authorities in support of the views advocated by us. "A great difference" says Willard, "prevails between the music of Europe and that of the oriental nations in respect to time, in which it resembles more the system of the Greeks and other ancient nations than the measures peculiar to the music of modern Europe." Again, another writer says, "nor are the ancient Hindu airs known to the Europeans from the impossibility of setting them according to our system of notation. The Hindus have quarter-tones, a fact which renders it still more difficult to express their music by our own system."* Mr. Whitten, in his lecture on the music of the ancients, delivered at the Calcutta Normal School, took the same view of the

* Oriental Collections by W. Ouseley Esq.

question. His words were as follows: "Few of the Hindu airs are known to Europeans, and it has been found impossible to set them to music according to the modern system of notation, as we have neither staves nor musical characters whereby the sounds may be accurately expressed."* Another writer, an equally independent authority, goes on to say that "considerable difficulty is found in setting to music the Ragas and Raginees, as our system does not supply notes or signs sufficiently expressive of the almost imperceptible elevations and depressions of the voice in these melodies; of which the time is broken and irregular, the modulations frequent and very wild."†.

It is thus generally admitted that Hindu Music, from its nature, does not admit of being represented by the European system of notation. Mr. Clarke may, therefore, will regale in the enjoyment of his pleasing visions supported by the distinguished authority of his progressive friends, and will we hope have the goodness to practically illustrate his theory with their invaluable aid as to how the Hindu system of notation may be superseded by the European.

We will conclude with a few words, pointing out certain errors into which Mr. Clarke has, perhaps unwittingly fallen in respect to certain musical facts and personal questions. In discussing the question of notation he incidentally mentions that the notation in use is not the Bengali notation but an invention of four years ago taken up by "a small but rich party in Calcutta." We are sorry to say that in making this statement our critic is entirely mistaken, or has allowed himself to be misled by the party to which he has apparently surrendered his critical judgment. If he had referred to the published works of his countrymen, he would have discovered his mistake. Amongst others we would

* Orchestra, March 14th 1868.

† Oriental Collections by Sir W. Ouseley. Mr. Clarke himself has given an indirect demonstration of the difficulty of representing Hindu Music by the European notation in the three lines appended to his article, and we are glad to find that Mr. Aldis takes our view of the case.

take the liberty to recommend for his perusal Sir W. Jone's works on Hindu Music. The notation in use is not one of four years invention, but of an age anterior to the commencement of authentic history. In proof of its antiquity we annex a facsimile of a printed form of notation, written in the oldest Sanskrit character, of বসন্ত রাগ.

गमनं

॥ म० रि ग० म० ध प० म प० म न० म० म प० म प० नि प० प०

नि म० म० गं गं रि म० वि म० वि प० म प० ॥ म र नि प० प०

नि म० म० नि प० म प० ॥ म म० म ग० ग रि म० म० नि प० म०
म प० म गी म० ध प० म म प० म गी म० म गी रि म० ॐ

We will not enter into the personal question, but we may state for Mr. Clarke's information that the party which shares our opinions in musical matters is nearly as numerous as to comprehend musicians of all degrees of taste and proficiency—of course the progressive party only excepted. In the appendix will be found a paper containing autographs of all the eminent Hindu and Mahomedan musicians of the day, who endorse our view of the question under discussion. We do not pretend to any knowledge of English music—the little that we know does not, perhaps, extend to much beyond a knowledge of the notes on a harmonium and the explanation of the notation. But we have taken the pains to study the particular branch of music in which we take pride and pleasure, and on which we have presumed to write.

Finally, we venture to express a hope that Mr. Clarke will do us the justice to believe that in all that we have said in the course of this controversy we have not been actuated by any unfriendly feeling, or hostile spirit. What grieves us most is that a gentleman of Mr. Clarke's erudition, scientific attainments, natural abilities, and high character, should have imported in this discussion the party spirit of those, who are themselves unable to understand or explain what they write about, and who have made him an exponent of their crude views and egregious misconceptions. If this paper satisfies Mr. Clarke that in advocating the national system we are simply following reason, truth, and history, we will consider ourselves amply repaid.

ओगणेशाय नमः ॥ कदीमजमानेसें यो आजतक हिन्दुस्तानमे
 इल्म सङ्गीतके यो हमारे नजदीक तमामदुनियाके सङ्गीतसे
 अच्छा अवर वडा है उसके आलिम अवर पण्डितने इस् इल्मकी
 बुनियादको के जो अवाजहे तिनचिज पर कायम कीया
 है एक सुर जिस्की सात किस्म दोसरे तालकी जिस्की बज्जत
 किस्म है तिसरी लय जिसे जमाना कहते है इसुरको तरकीव
 दीया है श्रुति, मूर्खना अवर सम्पूर्ण अवर असम्पूर्णसें अवर
 तालको तरकीव दीया है सम, अतीत, अवर विषम अवर
 अनागतसें मात्रोके हिसावपर अवर लयको तकसीम किया है
 दुरुत, मध, विलम्बितपर पस हमलोग आजतक उनयीकायदो
 पर इस् इल्मको वरताव मे लाये है अवर जोके श्रुति अवाजसे
 पयदा ऊँ है अब उसे सुर बनाया है इस्वास्ते इस्को हमसुरकी
 बुनियाद ओ मूल कहते है अवर इन सुरोंके चढाने, उतारने
 अवर बदलनेसे हरेक रकमकी रागरागिणी पयदा होती है
 पस अब जानना चाहिये इस् इल्मका प्रकाश होना दोचिजसों
 होता है एक गलेसें जीसे जीसे गाना कहते है दोसरा यन्त्रसें
 जेसेजीसे बजाना कहते है लेकीन गाना पहिले अवर जड़ है
 अवर कण्ठ उसके पयदा इश्की जगा है की जीसे गानेवाले
 ओस्ताद सातों सुरोंकी तरकीव कोमल, मध्यकोमल, अति-
 कोमल, तिवर, मध्यतिवर, अतितिवर अवर हरेकीस्की
 राग रागिणी की अलाप उसके फयलायके बज्जत अच्छीतरह
 कायदोंसे हरेक तरकीवत देखलायकर अदां करतेहे वगयर

दोसरेको मदतके अवर एकाम कुदरती है वरखीलाफ यन्त्रके
 केओ गलेकी नकल है अवर हाथका मोहताज है जैसे वीणा
 रवाव सीतार सरोद ओगयरह की वे दोसरेकी मदतके
 कोइ तरकोव सुरोंकी उस्ये जाहिर नही होती पस यो
 सकस इस्ये कहे केसुरोंकी तकसीम गलेसे यैसी नही होसकती
 यैसें यन्त्रसें सो उसका दावा गलत है चाहे इयोरोपका
 पण्डित इस इल्मका हो चाहे इशीयाकाहो ओसे चाहोये
 हमारे पास आवेहम उसको बज्जततरेसे सुरोंका हीसाव
 गनेसे कर देखावेगें वेतरदूत् अवर फोकरके अवर एवात
 मसुर नही है असल के असलीहि है नकल नकलहि है
 याने जो चीजके असलसे अच्छी जाहिर होगी नकलसें नही
 होगी पस गला आसल है यन्त्र उसकी नकलहै पस इस
 इल्मकी वारिकी अवर सुरोंका हीसाव अवर लय घटाव
 बढाव कीतावमे पढ़नेसे कवही मालुम नही होताहै खाली
 नाम जानना जबतक् गलेसे बज्जत रोज वरसों रीयाज न
 कीया हो जयसे बडे बडे ओस्ताद गानेवाले भारतवर्षके क्या
 हिन्दु, क्या मुसलमान जब इनोने वरसों इस इल्ममे रात
 दिन मेहनतको है तव उज्जो मिलाना अवर उक्सी तकसीम
 अवर जाननेसो मोस्कोल काम मोनासीव इस्ये है की अपने
 अपने इल्म अवर अक्कीलकी योर्सें अपने अपने कानोसे
 मालुम करलेते है अगर कोइ बडे लायक सकस इल्मके
 नामके जानेवाले, डाँड़ी माजी लोगोंके गानेको जो
 बिलकुल सब इल्मसें जाहिल होते है सुन्कर एसमझाँगे
 होन्दुस्तानका अवर सबसे अच्छा एही गानाहै तोहम

उनकी समझकी बहत् तारीफ करतेहे क्योनही जीस्की जयसी अक्कील उसकी ओसीही समझ उनको सवाय अवर क्या कहै तमाम भारतवर्षमे उत्तम अवर बेहतर सङ्गीतका एकीतरह चलन है जैसे सबलोग वरते आवे है वर्त्ताओ करते है सीरीफ फरक जवान और तरकीबकाहै पस हाम ए कहते है की यो आयुत वावु क्षेत्त्रमोहन गोस्वामीने भारतवर्षके इसुराने इल्म सङ्गीतके सुरोके घटाने अवर बढाने लीखने अवर वरतामे लानेका हीसाव इस इल्मकी संस्तुत अवर फारसीकि कीतावोंके कायदोसे आज-सरेनौ दुरस्तकायमकीयाहै ओहि सुरोंका हीसाव ओगयरह हम सब लोगोंकी रायके मोताबिकहै कायदेसं बाहरनही है इसे क्या हीन्दु क्या मुसलमान गायक गुणीहिकी एहि मतहै पस जोलोगके इस इल्मको खुब जान्तेहे अवर ओस्ताद है उमेद इसहरीरकी लेनेकि तस्दीक पर अपनी दस्तखत फरमावेतोनिहाएत मेहरवानी अवर इनायतहोगी ॥ १ ॥ * ॥

*Professor Nowlady
of Bombay*

श्रीकालीप्रसन्न वन्द्योपाध्याय
सेक्रेटारी बंगसङ्गीतविद्यालय
श्रीजोयालाप्रसाद दीच्छत

ध्रुपदिया

दसषतवद्रीमिसोर ध्रुपदिया

सुकलकान्ताप्रसादध्रुपदिया

श्रीशिवरामकुमार

दसषतहरिनाथ मीसर

खेयालिया

ध्रुपदिया

बालगोवीन्द मिश्र

दसषत गङ्गाप्रसादमिश्र

ध्रुपदिया

ध्रुपदिया



* العبد _____ *

* جنون خان سوز خوان *

* العبد _____ *

* عیوض علی خان سوز خوان *

* العبد _____ *

* عنایت حسین خان دهریدی *

* العبد _____ *

* احسان علی خان خیالی *

Baney Madhub Audhicary

Khaéuly.

* العبد _____ دل *

* علیجان خیالی *

* العبد _____ دل *

* محمد خان مین کار *

* العبد _____ دل *

* تاج خان دهریدی *

* العبد _____ دل *

* احمد خان دهریدی و ترانه سرای *

* العبد _____ دل *

* حمید ر خان دهریدی و ترانه سرای *

* العبد _____ دل *

* حکایم غلام محمد قانون نواز *

* العبد _____ دل *

* نعمت الله خان عقی غنہ سرد و نواز *

* العبد _____ دل *

* غلام حسین خان دهریدی *

لکھنؤ تمام ہندوستان میں اُتم اور اعلیٰ سنگیت کا ایک
 ہی چلن ہی کہ جسے سب لوگ برستی آئے ہیں اور برتاؤ کرتی
 ہیں صرف فرق زبان اور ترکیب کا ہی پس اب ہم یہ کہہ سکتے
 ہیں کہ جو سری حکیت بابو کہتر موہن گماٹین نے بہارت
 برہمن کے اس پرانی علم سنگیت کی سرونگا گھٹا و اور
 برہما و اور لکھنؤ کا حساب سنکر ت اور فارسی کے کتابوں کی
 قاعدوں سے از سر نو درست کیا اور قائم کیا ہی وہی سرونگا
 حساب وغیرہ ہم سب لوگوں کی راہی کے مطابق ہی اور قاعدہ
 سے باہر نہیں اس میں کیا ہندو کیا مسلمان کا بگ گنی سب
 کے ایک ہی مت ہی پس جو حضرات کہ اس علم کو خوب
 جانتی ہیں اور استاد ہیں ان کی خدمت میں عرض ہی کہ اس
 تحریر کی تصدیق پر اپنی دستخط فرما دیں نہایت احسان ہو گا فقط

* العبد کالی پرشن بند اپادھائے سکرتری اسکول سنگیت
 سنگا لہ بدیالی *

* العبد کالی پرشن بند اپادھائے سکرتری اسکول سنگیت *

* احمد خان خیالی *

سے سرو کا حساب گلے سے کر دکھائیگی بلاترود اور کیا یہ
 بات مشہور نہیں ہی کہ اصل اصل ہی نقلاں نقلاں ہی ہی
 یعنی جو چیز کہ اصل سستی اچھی ظاہر ہوگی وہ نقلاں سے نہ ہوگی
 یعنی گلا اصل ہی ساز اُسکی نقلاں ہی پس اس علم کی
 باریکیاں اور سرو کا حساب اور لی کا گہتا ویرا فقط کتاب
 میں پڑتی سنی کہی نہیں معلوم ہوتا ہی خالی نام جانتا ہی
 جب تک کہ گلے سے بہت برسوں ریاض نہ کیا ہو چنانچہ
 برقی برقی اور ستارگانے والے ہندوستان کے کیا ہندو کیا ہمارا
 جب اونہونے برسوں اس علم میں رات دن محنت کی
 ہی تب اونہونے سرو کا مانا اور اُسکی تقسیم اور
 جتنی مشکل کام متعلق اسکی ہیں اپنی اپنی علم اور عقل
 کے زور سے اپنی اپنی کانو نہیں معلوم کیا ہی اگر کوئی برقی لائق
 شخص اس علم کی نام کے جانی والی دانہری مانجھی لوگوں
 گانا کہ جو ما اکل سب علم سے جا ہمار ہوتی ہیں سنکر یہ کہیں اور
 سمجھیں کہ ہندوستان کا عمدہ اور سب سے بہتر گانا ہی تو ہم اونکی
 سمجھ کے بہت تعریف کرتی ہیں کیون نہ ہو جسکی جیسی عقار
 اُسکی ویسی ہی سمجھ اونکو سوائے اسکی اور کہ

انہیں سرونکی پرتائی اور ادتارنی اور مدلتی سے ہر ایک
 قسم کی راگ وراگنی پیدا ہوتی ہیں۔ بس اب خانہ پناہیئے
 کہ اس علم کا ظہور دو چیز سے ہوتا ہے ایک گلو سے کہ
 اُسے گانا کہتی ہیں دوسرا جنترا اور ساز سے کہ اُسے
 بجانا کہتی ہیں لیکن گانا اول اور اصل ہے اور گلا اُسکی
 پیدا ایش کے جگہ ہے کہ جس سے گانے والی استاد سات
 سرونکی ترکیب کو مل مذہ کو مل آتے کو مل تیو ر مدہ تیو ر آتی
 تیو ر اور ہر ایک قسم کے راگ وراگنی کے الپ اور
 اُسکی سرونکے پہلو کو بہت اچھی طرح قاعدون سے ہر ایک
 کا فرق دکھانا کر ادا کرتی ہیں بغیر دوسری مدد کی اور یہ امر
 قدرتی ہے برخلاف جنترا کی کہ وہ گلے کی نقاں ہی اور ہاتھ کا
 نتائج ہی جیسی ہیں۔ باب ستار سرونکے وغیرہ کہ بغیر
 دوسری مدد کے کوئی ترکیب سرونکی اُس سے ظاہر
 نہیں ہوتی۔ بس جو شخص یہ کہی کہ سرونکی تقسیم گلے سے
 ایسی نہیں ہو سکتی جیسی ساز سے سو اُسکا دعوی غلط
 ہے خواہ پورب کا ہندوستان اس علم کا ہو خواہ ایشیا کا مناسب
 سکو کہ ہمارے پاس آوے ہم اُسکو بہت اچھی طرح

قدیم زمانہ سے جو آج تک ہندوستان میں علم سنگیت
مروج ہی اڑ جو ہمارے نزدیک تمام عالم کی سنگیت
اچھا اڑ رہا ہے اس کے عالم اڑ رہے ہیں نے اس علم کی بنیاد
کو کہ جو آواز ہی تین چیز پر قائم کیا ہے ایک سر کہ اس کے
ساتھ قسم ہی دوسرے تال کہ اس کی بہت قسم
تیسرے لے کہ جسے زمانہ کہتی ہیں پس سر کو ترکیب
دیا ہے سروتی اور مور جھنا اور سنپورن اور اسنپور
سے اڑ رہا تال کو ترکیب دیا ہے سم اور استیت اور
سم اور اناکت سے ماترو نکی حساب پر اور لے کو تق
کیا ہے دست مدہ بانیپت پر پس ہم لوگ آج تک اوپر
قاعدون پر اس علم کو برتا دین لاتی ہیں اور چونکہ سمرتی اور
سے پیدا ہوتی ہیں اور اس سے سمر بنا ہے اس واسطے
اس کو ہم سب لوگ سر کی بنیاد اور اصل کہتی ہیں



31°

Exis allunder

Form

Sutlej R

Simla

31°

Rupar

Loodiana

Machewarra

Sirhind

Chunikour

Shenwal

P Daria

Choota

Patiala

Gugger R

Markanda R

Saraswati R

Gugger R

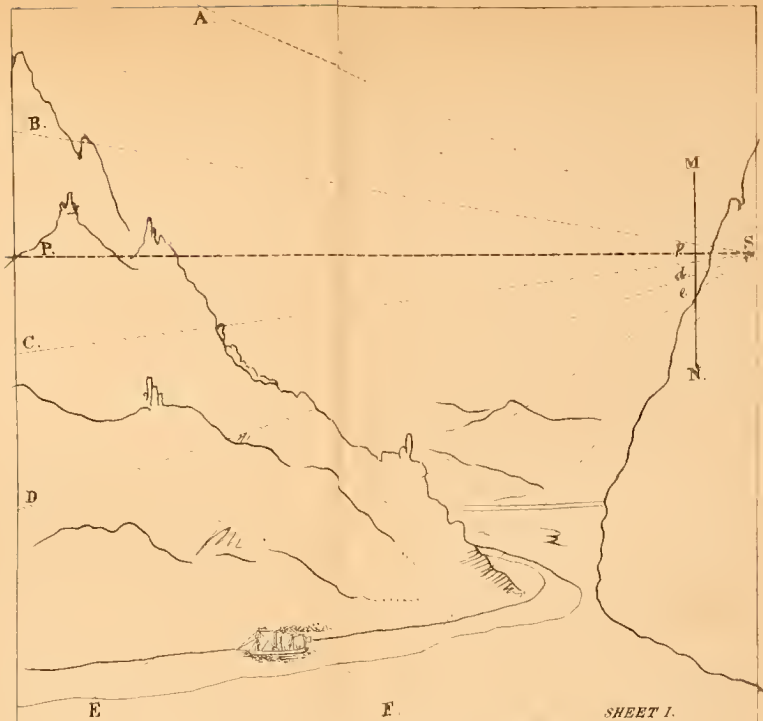
Old Saraswati R.

Trishadwati R.

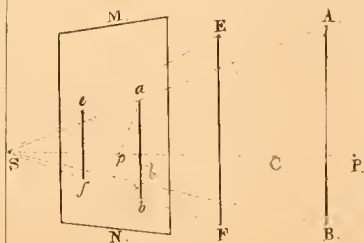
R.

21

26°



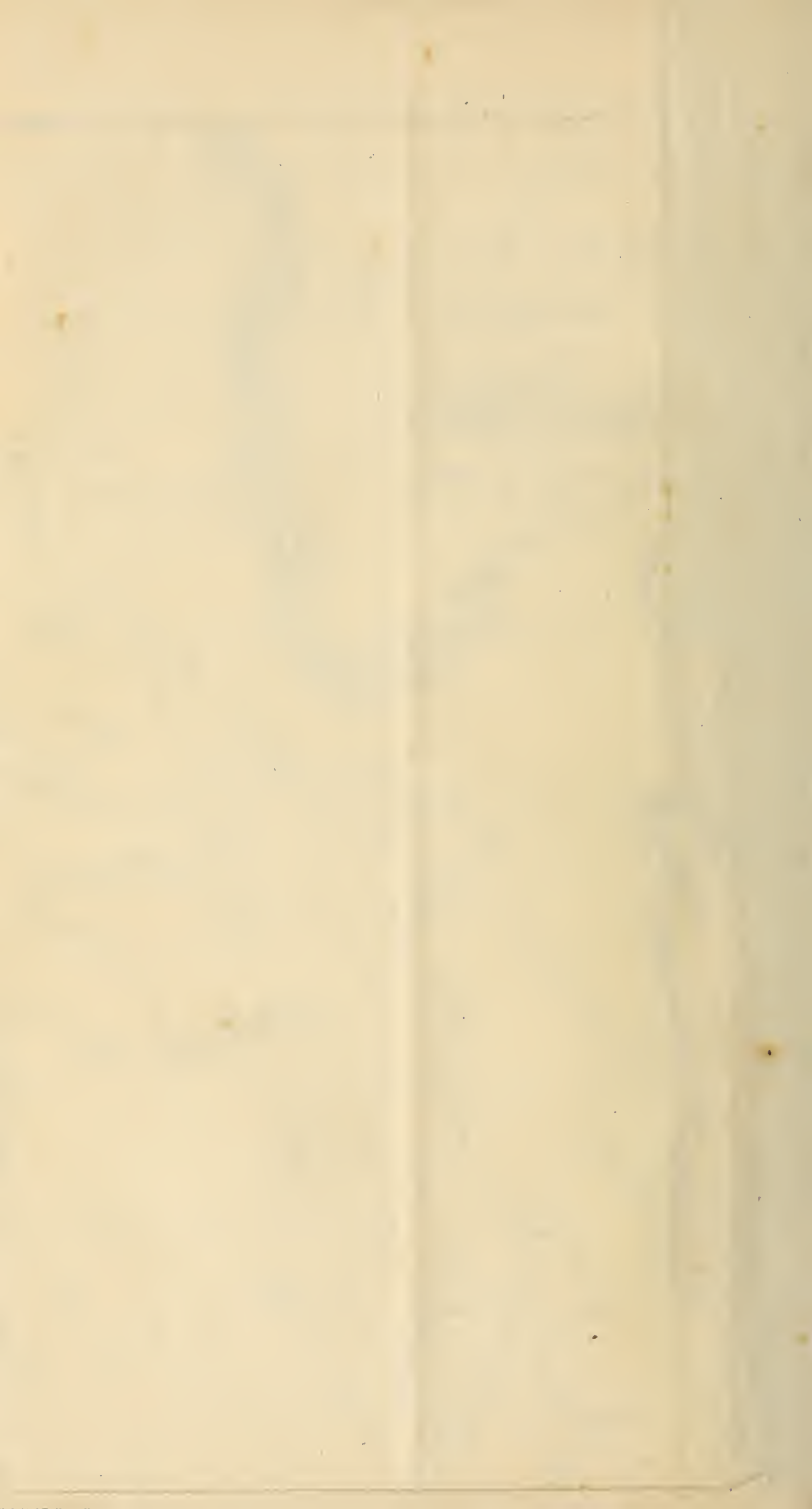
SHEET I.



SHEET II



SHEET III.



From the Author

NOTES ON THE LOST RIVER OF THE INDIAN DESERT.

THE large blank space marked "Great Desert," in the north-west of the Map of India, is probably familiar to most people. Some, however, may not be aware that a considerable portion of this tract was once cultivated and prosperous, studded with towns and villages, and inhabited by powerful tribes.

No doubt a great part of the desert has undergone little change since pre-historic times. Its ancient name of Marus-thali (region of death) proves this. But with regard to the lands of Nair and Kadal—the Ramala of the Arab geographers—the truth of the legends, which assert their ancient fertility, is attested by the ruins which everywhere overspread what is now an arid, sandy, waste.

In confirmation of the local traditions, which ascribe the desolation of this once flourishing country to the drying up of the stream by which it was fertilized, the dry bed of a large river may still be traced from near the Himálaya, through Bhat-tiána, Bikanír and Bháwalpur, into Sindh; and thence onwards to the Rann of Kach (Runn of Cutch).

This old channel, which is more than six hundred miles in length, is known in different parts of its course as Naiwal, Sotra, Hakra, Wahind, Dahan, &c. The names Sotra, Hakra, and Wahind are those most generally used, the others being more local.

In Kiepert's Map of Ancient India,* the Sotra or Hakra is represented, by a dotted line, as a continuation of the Gaggar; and as joining the Indus a little below Uchh. The true position of the channel is, however, forty miles south of that city; and it is plainly traceable onwards into Sindh.

Major-General Cunningham, R.E., has, in his Ancient Geography of India, laid down the course of the Hakra correctly from longitude 74° to longitude 70° (Maps V, VI and IX) as Neudras,

* In illustration of Prof. Lassen's Indian Antiquities.

Fluvius, Sotra, and Chitrang. But instead of joining the Indus above Bukhar, as represented in Map IX, the river, in latitude $27^{\circ} 55'$, longitude $69^{\circ} 56'$, turned southward and then westward to about thirty miles south-east of Rhorī. At this point its bed becomes continuous with the old channel generally known as Narra or Nala, which is to be traced onwards to the Rann of Kach. To the Narra, I shall again refer.

Along the course of this lost river, are scattered mounds great and small, marking the sites of cities and towns; many of which must have been of considerable importance.

Amongst these remains are found huge bricks such as were used by the old Hindus, but have not been made in India for centuries; with these, however, are others of a much later period. Fresh water shells, exactly similar to those now existing in the Satlej and Indus, are found in many parts of the tract referred to.

So unsettled was the condition of this part of India at the time the great changes referred to took place, and so complete was the desolation produced by them, that of such a series of events as the drying up of a large river, the ruin of cities and towns, the depopulation of provinces, and their conversation into desert, little more than a few legends remain amongst the scanty population of this inhospitable region.

The Sotra or Hakra has been generally supposed to be the dried-up bed of the Gaggar, which rises in the outer Himálayan range (now called Sewálik) between the Satlej and the Jamna.

As, however, no large river is mentioned in the Vedas, or other ancient Hindu writings, between the Saraswatí and the Satlej, some authorities have considered this channel to be the old course of the former. This it could not have been, as that sacred stream is said to have lost itself in the sand in the time of Manu; while the Hakra, as I shall presently show, was flowing in the thirteenth century. Both Gaggar and Saraswatí undoubtedly joined the Hakra, but they did so merely as tributaries; as did the Chitrang, which also rises in the so-called Sewálik range, and has been identified with the Drishadwati of the Rig-Veda and Mahábhárata.

The waters of all these streams combined could never, under any imaginable conditions, have maintained a permanent river of such magnitude as the Hakra, for a distance of more than five hundred miles beyond the furthest point to which they reach at the time of their greatest floods.

It should be borne in mind that this long course was through a thirsty and nearly rainless region, which, below the junction with the Saraswatí and Chitrang, did not furnish a single feeder.

This absence of branches is sufficient to dispose of a theory which has been put forward, that the Hakra dried up owing to a diminished rain-fall.

A little consideration, however, would have prevented any attempt to solve the mystery in this way ; for it must involve the supposition of such meteorologic conditions as would have rendered the nursery of the Bráhmaṇ race an uninhabitable swamp. The neighbouring large rivers, too, must in such case have been vast in proportion, which, as their channels show, they were not. Some of these streams, indeed, mentioned in the Vedas as being fordable, are so with difficulty at the present day.

In addition to this, we find from the hymns of the Rig-Veda that instead of rain being in excess, relief from drought was frequently prayed for, even in the tract near the hills where the rain-fall must have been heaviest.

The god whose praises were most frequently sung was Indra, who gave "rain to the sacrificer."*

The Gaggar, Saraswatí, and their tributaries contain but little water except in the rainy season. Their sources being in the outer and lower Himálayan range, they are fed by rain only, and not by the melting snows also, as are all the large rivers of Northern India. The collecting ground of these streams, moreover, is, and always must have been, very limited, as it lies between the Satlej and Jamna valleys.

There is nothing in history to show that these rivers ever contained much more water than they do now. Some diminution in their volume may have taken place during the lapse of ages, from changes in the lower Himálayan range, as well as from the destruction of forests and increase of irrigation. There is, no doubt, also a tendency to the obliteration of the lower portion of their course ; partly by the drift of sand and dust from the desert, and partly by the deposit of the silt, brought down by the streams themselves, owing to the absence of the great river by which it would have been carried off to the sea. All these influences, however, have, as we find from history, produced but little effect during a very long period.

Our knowledge of the condition of this tract of country previous to the time of Sultán Fírúz Sháh, in the fourteenth century, is very vague. That ruler made several attempts to remedy the desert condition of the lands about Sirsa and Hissar, by bringing water from the Satlej and Jamna into some of these old river-beds. Before this, according to the Táríkh-i-Fírúz Sháhi, travellers passing that way from Irak and Khorasán had to pay as much as four *jitals* for a pitcher of this necessary of life.

It is evident from this, and from the description given in the Mulfuzat-i-Timuri and the Zafar-námeḥ, of Timur's march from Ajodhan (Pak Pattan) to Dehli, that in the fourteenth century

* Original Sanskrit Texts, II, 361.

neither the Gaggar nor the Chitrang flowed further than they do at present. Indeed, as already observed, it is impossible, from the nature and area of their collecting ground, that the course of these streams can ever have extended to any considerable distance beyond its present limits.

Since, then, these rivers could not have furnished it, whence came the great volume of water which once made its way down this broad channel to the sea? Between the Jamna and the Satlej, there is no opening by which a large river could have entered the plains. There is no sign of the former having carried off the waters of the Hakra; but in the case of the latter, there is evidence of changes quite sufficient to explain the transformation of a once fertile region into a desert.

There can be no doubt that the Satlej, instead of turning nearly due west from Rupar to join the Báyás, as at present, originally flowed in a much more southerly direction; and that the Sotra or Hakra is its ancient bed.

One of the hymns of the Rig-Veda (33rd of third Mandala) has been considered to allude to a junction of the Satlej and Báyás at a very remote period. The Rishi Viswamitra is represented as fording, with a wagon and chariot, a stream called Chhutudri and the Vipas, near their confluence.

That one of the rivers mentioned in this passage was the Báyás is evident, but that the other was the Satlej is more than doubtful.

There is nothing in the context to show that the latter river is alluded to.

Elsewhere in the Rig-Veda, as well as in the Nirukta, the name given to the Satlej is S'utudri, which in the Mahábhárata and later writings is rendered Sátadru; but the stream here referred to as joining the Vipas is called Chhutudri. This name is applied to the river not only in the hymn itself, but also in the Nirukta, and by the comparatively modern commentator Sayana, without any remark to show that the S'utudri is indicated.

Again, the rivers are described as rushing from the sides of the mountains; the scene must, therefore, have been near the foot of the Himálayas and very far from any possible point of junction between the Satlej and Báyás.

Further, the Báyás is addressed in the hymn as by far the most important of the two streams, and is called "the broad and beautiful Vipas," no such epithet being bestowed upon the Chhutudri, although, had the latter been the Satlej, its volume must have been nearly twice as great as that of the Báyás.

It appears most probable that Chhutudri was not the Satlej, but the river now known as the Chukki, which joins the Báyás shortly after that stream enters the plains; and which is remarkable for the rapidity with which it rises and again subsides.

Variations in the names of the rivers are generally carefully noted in the Nirukta ; thus we learn that the Báyás acquired the name Vipasa after and in consequence of the attempted suicide of Vasishta. Previously, the river was called Uranjira and Arjikia.* From Uranjira was possibly derived the Saranges of Arrian, the ancient name of the Vipasa being mistaken for a separate stream. This is the more likely, as the Saranges appears to have no modern representative, the position of the Sohan, to which the name has been applied, not agreeing at all with Arrian's description.

It is probable that the legend related in the Mahábhárata, of the Satlej having separated into a hundred channels when Vasishta threw himself into it, was founded upon some great change in its course.

That the Báyás and Satlej ever mingled their waters, previous to the thirteenth century, is opposed to the traditions current throughout the tract between these rivers and the Saraswatí; which agree that, until this period, the Satlej flowed in the Hakra channel.

These legends are strongly supported by the physical aspect of the country ; while they are confirmed by the fact that several of the old river-beds, which combine to form the Hakra, have been traced to within so short a distance of the Satlej that they could not have belonged to any other stream.

Between the Saraswatí and the Garrah is a series of broad channels, most of them a mile or more in width, of which those to the west terminate in the valley of the latter river ; while those towards the east, which are the most ancient, are continuous with the Sotra or Hakra. All diverge from the direction of the point at which the Satlej leaves the hills.

Most of these old river-beds are now dry, or only contain a little water in the rainy season. They are all more or less obliterated in the upper part of their course, so that only the comparatively recent ones can be actually traced to the banks of the Satlej, but most of them can be followed up to within a few miles of that stream.

Of the channels continuous with the Hakra, the westernmost, which is known as Naiwal, was found by Lieutenant (now Colonel) Hodgson, R.E.,† in 1847, to be clearly defined at the village of Urkara, about twenty miles south-west of Ludiánah, and half that distance from the old left bank of the present Satlej. It has since been traced some miles further towards the north-east.

Near Shekopura, about half-way between Urkara and the

* Original Sanskrit Texts, I, 417 ; † Report on proposed Tehara Canal.
II, 342.

river, are two more channels similar to that just mentioned, one of which branches off from the other. Both of these turn towards the west, enter the valley of the Báyás and Satlej, and become continuous with the old course of the latter stream known as Dhund-i-Daria, which will be referred to presently.

Thus, the most westerly arm of the Hakra and the easternmost of the old beds of the Satlej, traceable to the Báyás valley, are, although partially obliterated by time, still definable to within five or six miles of each other; and this in a level plan. There can be little doubt that these deserted channels diverged in succession from the same point; and that, although they separate so widely, the same stream at different times flowed in each of them.

From Urkara the Naiwal may be traced, in a south-westerly direction, to Abohar, which is situated upon its banks; and thence to Kurrulwála (latitude $29^{\circ} 53'$, longitude $73^{\circ} 53'$) where it is joined by another similar river-bed, from the eastward, which bears the same name. The people of the country assert that each of these in turn was the bed of the Satlej; and that the eastern branch came from near Machewara, an ancient town, twenty miles from the point at which that river enters the plains.

The celebrated fortress of Bhattinda is situated upon the Naiwal last mentioned. This is, no doubt, the river-bed referred to by Mr. Davidson, Settlement Officer of the Ludiánah district, in 1851, as extending from the southward of Machewara to near Tulwundi (fifty miles north-east of Bhattinda) and thence onwards to the south-west.

At Kurrulwála, where these two channels of the Naiwal unite, they become continuous with the western arm of the Sotra or Hakra, which, passing by Tartarsir and Ganeshgarh to Bullur on the borders of Bikanír and Bháwalpur, there joins the eastern or Bhatnair branch. This, a still older course of the river, is formed by the junction of several broad channels known as Naiwal, War or Wah, Purána Daria or Gaggar, Chitrang, &c.

Each of the three first of these is said to have been in turn the bed of the Satlej. This has been confirmed so far that, during the surveys for the Sirhind Canal, the Naiwal has been traced to Chumkour, close to the old high bank of the Satlej, and five miles from its present course. This place is ten miles from Rupar where the river enters the plains, and about the same distance from the town of Machewara already referred to.

The Chitrang was converted into an irrigation canal by Fírúz Sháh in the fourteenth century. The Wah, which receives the torrent known as Sirhind-nallah, was also in the same reign

utilized as a canal ; the Sirsa torrent being turned into it through a great cutting, traces of which still remain near Rupar. The same channel was long afterwards connected with the Satlej by Mirza Kundi. The Naiwal is dry.

In the old river-bed now known as Gaggar flows the stream of that name, the waters of which, however, although supplemented by those of the Sarsuti, are exhausted before they reach the junction with the other branches of the Hakra. According to tradition, this, as already mentioned, was originally the bed of the Satlej. It is continuous, near Munak, with the Purána Daria (ancient river), a broad channel which is unconnected with any of the streams flowing from the neighbouring hills, and which has been traced in the direction of Sirhind and Rupar, to within a few miles of the Wah just referred to.

It would appear that when the Satlej changed its course to the westward, the Gaggar torrent, previously a tributary, was left in possession of the deserted channel.

The Gaggar must originally have been of much less importance than it is at present, for the Sarsuti (Saraswatí) which now falls into it above Munak, formerly flowed much further south, and joined the old channel just mentioned below the famous fortress of Sarsuti (now called Sirsa), which was built upon its banks in the sixth century.

By the change just alluded to, the course of the Sarsuti was shortened nearly one hundred miles ; and the Gaggar became the principal river of the country, giving its own name, as far as its waters reached, to the old bed of the Satlej ; in which it continued to flow.

The foregoing accounts for the absence of all mention in the Vedas or Mahábhárata of any such river as the Gaggar, or indeed of any important stream, between the Satadru (Satlej) and the Saraswatí. Of the five rivers so frequently named between the Indus and the sacred stream, the Satadru is always alluded to as nearest to the latter.

All this is confirmed in the strongest manner by the fact already mentioned, that, between the Sarsuti and the Satlej, there is no opening in the hills by which a large river could have entered the plains.

The disappearance of the Saraswatí is readily explained by the changes just alluded to ; for that river, no longer able to reach the Satlej, which had forsaken its ancient course, necessarily lost itself in the sands of the deserted channel until, as already explained, in later times it joined the Gaggar above Munak.

The Saraswatí is always described in the Rig-Veda as a flowing stream ; and nothing is there said of its disappearance in the sand, as afterwards alluded to in the Mahábhárata and by Manu. Nor

is there in the Veda any hint of the mythical subterranean course referred to in the Raghuvansa, and since extended by the Bráhmans to the Triveni near Alláhábád.

It is possible that the Saraswatí once flowed still further south, and joined the Chitrang, but of such a course no vestige now remains.

About A.H. 757 (A.D. 1357) Sultán Fírúz Sháh converted the old bed of the Saraswatí into an irrigation canal, by which he brought the waters of the Gaggar to Sarsuti, and thence to the "rivulet of Khera (Hakra?), upon which he built a city named after him Ferozábád."* This Fírozábád was built upon the channel now called Gaggar, which, therefore, is identical with the so-called "rivulet of Khera."

The upper part of the Hakra is called Sotra or Sutra, which is probably a corruption of Sutodra or Sutudri, the old name of the Satlej.

Hakra appears to be a modified form of Sagara, the letter *S* being pronounced like *H* in Rájputána and in Sindh.

The old beds of the Satlej referred to are more or less obliterated in their upper part, by the process of silting-up, which from the constant abrasion of the mountains, and the very much heavier rainfall, is far more active in the sub-Himálayan tract than in the dry and level plains.

The current of the Satlej is rapid, especially where it first leaves the hills, and the soil through which it flows is light and sandy; the stream has therefore cut deeply into it. Owing to this, and to the effects of the silting-up process just alluded to, the present bed of the river is much below the level of these old channels. This difference is, for the reasons already given, most marked near the Himálayas, and it diminishes very considerably further south.

The result of the same processes of erosion on one hand, and silting-up on the other, may be seen in the difference of level between that part of the old bed of the Báyás which is dry, and the portion in which the combined rivers have been flowing for less than a century.

To the effects of the ordinary changes in the bed of the Satlej, already alluded to, must be added those produced by the cataclysm of A.D. 1762, when the river was dammed up for some weeks by a landslip in the hills, and, as mentioned by Major-General Cunningham, its waters rose to a height of four hundred feet before the barrier gave way.

The general slope of the country intersected by these old river-beds is from the north and east, towards the south and west, in which direction the changes referred to have taken place.

* Ferishta, Dow's Ed., I, 306.

A tendency to change their course is to be observed in most of the Panjáb rivers. In the case of the Satlej, this is accounted for amongst the people by the following legend :—

“In the time of the great Rájá Salwan (Sáliváhana) the Sutludra (Satlej) flowed southwards from the Himálayas, through the country now occupied by the Bikanír and Bháwalpur states, and onwards through Sindh to the sea.

“Puran, the eldest son of Salwan, who had become a religious ascetic, for some reason invoked a curse upon the river, and ordered it to leave its bed and go to join the Ráví. The river obeyed, and began from that time to change its course more and more towards the west ; till six hundred and fifty years ago, it entered the Báyás valley. The western branch of the Naiwal, then deserted by the stream, was the last of these channels connected with the Hakra which, therefore, at this time (A.D. 1220) finally ceased to flow. The zamíndárs (landholders) afraid that the river, in obedience to the command of Puran, would soon leave their lands, as it had already done those further south, besought the intercession of the holy Shaikh Faríd-ud-dín Shukar Ganj. This great apostle of Islám, having prayed, commanded the wandering stream not to move beyond five kós (7 miles) from the bed in which it was then flowing.” This was the channel to the west of Abohar known as Dhunda or Dhund-i-Daria, and has been already alluded to.

Puran, son of Salwan, is the hero of many legends in the Panjáb ; and many disasters, especially famines, have been attributed to his curse.

The account of the intervention of Baba Faríd is probable enough. The good offices of holy men are still sought when changes occur in the course of these rivers, as is so often the case in the rainy season ; when sometimes the whole lands of a village are carried away in a few days.

Shaikh Faríd died in A.H. 660 (A.D. 1261) at the age of 77,* and his memory is still held in the greatest veneration throughout a large portion of the Panjáb. His tomb at Ajodhan, now called Pak Pattan (holy ferry,) was visited by Firúz Sháh, and by Timur, and is still a celebrated place of pilgrimage.

That the lands on the banks of the Hakra thus became waste in the first-half of the thirteenth century, is confirmed by the tradition still preserved throughout the course of the lost river, that at this period the country was depopulated by a terrible famine, and that the surviving inhabitants took refuge in the valley of the Indus, the tract then abandoned having ever since been desert.

It is stated in the Tabakát-i-Násiri, that when Uchh was besieged by the Mughuls, in H. 643 (A.D. 1245) the army sent to its relief

* Or, according to another account, in H. 664 (A.D. 1265) at the age of 95.

was unable to march by Sarsuti and Marot, in consequence of the drought on the banks of the river. Marot is now in the heart of the desert; but then the high road from Dehli to Multán passed under its walls, and followed the course of the Hakra from near Sarsuti to within a few marches of Uchh. After this period, armies marching from Dehli to Multán always took the road by Abohar and Ajodhan; but the more direct way by Marot was occasionally taken by travellers for some time later.

Colonel Tod mentions that the only information he could obtain as to the drying-up of the Hakra (which he supposed to have been the Gaggar) was from a couplet recited to him by an old man of Dandosir near Bhatnair. This was to the effect that the country was rendered waste by the river ceasing to flow in the time of Rai Hamir Sodha.* According to the Muntakhab-ut-Tawarikh,† Hamir was the last of the Sumra dynasty which ruled in Sindh and over a considerable portion of the desert of Maru. The Sumras were a branch of the Soda tribe of Rájputs, and their downfall occurred in the thirteenth century, after the destruction of their lands by the drying-up of the Hakra.

The Satlej when it abandoned the western Naiwal, entered the valley of the Báyás, as already mentioned, and flowed under the high land which formed its eastern boundary. At this time, therefore, took place the first junction between these rivers, and their combined streams were henceforward known as Beyah (Báyás). The application of the name Satlej to the streams below the confluence is a modern innovation, and is not to be found in old writings, Hindu or Muhammadan. The Garrah was never known as Satadru or Satludra.

Thus, in the Tabakát-i-Násiri it is mentioned that in A.H. 643 (A.D. 1245) news arrived of an army of Mughals under Mangu Khán having reached Uchh. The Sultán Alá-ud-dín marched from Dehli to drive back the invaders and "when he arrived on the banks of the Beyah the infidels raised the siege of Uchh."‡

Here the allusion is to the united streams. The Satlej is not mentioned, although the writer was with the army, that river having been become merged in the Báyás.

Again, the same authority says that in H. 655 (A.D. 1257) Malik Kishlu Khán Balban came from Sindh to the banks of the Beyah, from whence he marched to Samána.§ Here the combined Báyás and Satlej is evidently meant.

We are told also, in the Tárikh-i-Fírúz-Sháhi, that in A.H. 667 (A.D. 1268) the Mughal horse crossed the Beyah, but were quickly driven back by forces from Multán, Samána, &c.||

* Annals of Rajasthán, II, 187.

† Elliot, I, 345, 485.

‡ *Ibid.*, II, 344.

§ Elliot, II, 356.

|| *Ibid.*, III, 112.

In each of these instances, as also in several passages of Ferishta, the river called Beyah is that which we now know as Satlej or Garrah. This is no clerical error, for the term is never applied to the Satlej above the confluence. Thus, according to the *Tárikh-i-Alai*, in A.H. 695 (A.D. 1296) the Tartar chief, Kadar, came with an army from the Jud mountain (Salt Range) and crossed the Jhelam, Beyah, and Satlader (Satlej).” * As this invader was defeated near Jhelander, he must have crossed the latter rivers above their junction.

In the *Tárikh-i-Mubárák Sháhí* it is said that in A.H. 796 (A.D. 1395) Sarang Khán crossed the Satlader near Tehara.† And again, that in A.H. 823 (A.D. 1420) the rebel Tughan Rais with an army crossed the Satlader at Ludiánah.‡ These towns are above the meeting of the two streams. The same authority applies the term Beyah to the combined rivers near Uchh.§

It was not by Musalmán writers only that this name was given to the stream which we now call Satlej or Garrah, for Colonel Tod observes that in the ancient chronicles of the Bhattis of Jesalmír, who were lords of the country on both its banks, “the Garrah is always called Beah.”|| To this day, the river below Fírúzpur is known to the boatmen as Báyáh or Garrah. The modern term Satlej is rarely if ever used, except by those who have been brought into contact with Europeans.

All this shows pretty clearly that the Satlej is an interloper, and the Báyás the original stream. Had it been otherwise, the mighty Satlej must have retained its name throughout its course.

There is a legend to the effect that the Naiwal, and therefore, also the Hakra, became dry in consequence of a Rájá who lived near the hills having diverted the course of the river, by a *bund* (embankment), in order to be revenged upon the chief of Bhattinda. This story is, probably, as true as that of Puran’s curse, but both are confirmatory of the other evidence that each of these channels was in turn the bed of the Satlej.

Besides the ruins already referred to, many places of ancient renown still remain, in a more or less decayed condition, upon the banks of the Hakra and its branches. Of these may be mentioned Sarṣuti (Sirsa), Bhatnair, Rangmahál, Sodul (Suratgarh), Ulwana (Sirdargarh), Bhattinda, Mehera, Abohar, Bullur, Phulra, Marot Maujgarh, Derawal, Trehaira (Díngarh), Nobur (Islámgarh,) and Thanót. Most of these were flourishing at the time of the early Muhammadan invasions.

In Sindh, the sites of many once famous towns, whose positions

* Elliot.

† *Ibid.*, IV, 29.

‡ *Ibid.*, IV, 53.

§ Elliot, IV, 33.

|| Annals of Rajasthan, II, 262.

are disputed, may possibly yet be found upon the banks of this old river-bed.

With regard to the changes which led to the drying-up of the eastern or Bhatnair arm of the Sotra or Hakra, I have been unable to fix any dates for their occurrence; but it is probable that this channel was abandoned by the stream at least a century before the Hakra finally ceased to flow. The Bhattinda Naiwal, which next became the course of the river, was supplanted by the western or Abohar branch; and this was in its turn deserted, as already alluded to, in the first-half of the thirteenth century.

According to the legend current on the spot, Bhatnair was founded by Bharat, brother of Rāma, three thousand years ago. In the middle of the eighth century this fortress was held by the Chohan Rājputs,* and in the eleventh century it is mentioned, with Multán and other important places, as tributary to the Chohan, chief of Ajmír.† Tradition asserts further, that the fort (which had, probably, been destroyed by the Ghaznvide invaders) was rebuilt in S. 1102 (A.D. 1045); and that the Sotra then flowed under its walls.

Bhattinda, though, probably, less ancient than Bhatnair, was also a place of note. It is by some writers considered to have been one of the capitals of Jaipál, the great opponent of Mahmud, and to have been taken and sacked by the latter on his first expedition to India. Sir H. Elliot, however, points out that this is an error, and that Waihind, on the Indus, was the city destroyed on that occasion‡ Local tradition says that Shaháb-ud-din, after the defeat of Rai Pithura (A.D. 1193), repaired the fort of Bhattinda and dug a canal to supply it with water; so that the branch of the Naiwal upon which it was built had then become dry, and the river must have been flowing in that to the westward, under the walls of Abohar.

About A.H. 664 (A.D. 1265) Bhatnair and Bhattinda were repaired by Malik Sher Khán, and occupied as defensive posts against the raids of the Mughals.§ It is probable, therefore, that both strongholds had then been for some time abandoned, owing to the surrounding lands having become waste from the changes in the course of the river lately referred to.

At the time of Timur's invasion, the Satlej, or at all events a portion of it, still flowed in the Dhunda, or Dhund-i-Daria, already mentioned, which is under the high bank forming the eastern boundary of the Báyás valley, and some twelve miles from the Naiwal.

As the term "Dhund" is generally applied to a channel containing

* Annals of Rajasthan, II, 447.

† *Ibid.*, II, 446.

‡ Elliot, II, 348.

§ *Ibid.*, III, 109.

water, but which has been deserted by the principal stream, it is probable that the main body of the river had then moved further west.

According to the *Tárikh-i-Mubárák Sháhí*, Taghi Khán Turkchi, one of the leaders of the disturbances which followed the departure of Timur, marched in H. 801 (A.D. 1400) from Samána towards Debalpur against Khizr Khán, with whom he fought a battle on the banks of the Dahunda in the khitta (district), of Ajodhan. The former chief was defeated and fled to Abohar.*

Again, in H. 808 (A.D. 1406) Malik Ikbál Khán marched from Rupar towards Multán, and fought a battle with Khizr Khán, on the banks of the Dahunda, near the khitta of Ajodhan.†

In S. 1650 (A. D. 1593) the Satlej again altered its course in the same direction, towards Fazilka. After this several similar changes took place, till at last the main streams of Bìyás and Satlej met at Hariki Pattan, and since A.D. 1796 have occupied the same channel.

Previous to the junction just referred to, it appears that the combined rivers did not flow in one bed as at present, but separated into several streams, every part of the wide valley being furrowed by the numerous channels occupied at different times. One of these is called the Garrah, and local tradition asserts that from this the present river derived the name. The same authority says that in the time of Shaikh Bhawal Huk (early part of thirteenth century) the course of the Bìyás was between Kuhror and Dhoniapur. In the *Ain Akbari*, the Satlej and Bìyás are said (A.D. 1596) to unite near Ferozpúr, then to divide and flow in four streams called Har, Hari, Nurnai, and Dhund, which join again near Multán. Most of these old channels bear several different names; and it is probable that one of those referred to was the Garrah, upon the banks of which (A.D. 1524) Mirza Hussian Sháh Arghun drew up his army to meet the attack of the Governor of Multán, who was marching to relieve Uchh.‡

When the main streams of the two rivers met at Hariki Pattan the greater body of water took the present more direct course, which, probably, differs little from that of the Hyphasis of Alexander, being to the eastward of most of the old channels.

In S. 1840 (A.D. 1783) the course of the Satlej reached its furthest limit towards the north-west. The bed of the river is now about twelve miles to the south of that in which it then flowed.

It is impossible that the Satlej and the Bìyá could have flowed as separate rivers in the same valley, for there was no water-shed to keep them apart; and the land is so low, and is intersected in every direction by such a network of old channels, that their waters must have mingled at every flood.

* Elliot, IV, 38.

† *Ibid.*, IV, 40.

‡ Elliot, I, 314.

Previous to the thirteenth century, history not only makes no allusion to any junction between the Satlej and the Báyás, but ignores the former entirely as an affluent of the Indus. Arrian, Strabo, and other classical writers, as well as the Arab geographers, omit all mention of the Satlej when describing the tributaries of the Indus. As the two rivers did not meet till they reached the Rann of Kach, this is sufficiently accounted for.

Thus, too, is solved the difficulty in providing a place for the Satlej amongst the five branches of the "Panjnad," which has compelled modern geographers to transfer that name from the Indus to the Chenáb. The latter has no claim whatever to this title which, as Burnes justly observes, is unknown upon its banks.* The "Panjáb" or "Panjnad" is the Indus itself. The "five rivers" of the Vedas and Mahábhárata were five separate streams. The application of the term to any one river appears to be of later date.

Arrian's description of the four branches of the Indus is very clear. In his account of Alexander's voyage, this writer says:—"And he had not sailed far before he arrived at the confluence of the Hydraotes and Akesines, for the Hydraotes flowing into the Akesines there loses its name. Then sailing down the Akesines he came to the place where it falls into the Indus. For these four large and navigable streams at last discharge their waters into the Indus, though they do not preserve their individual names until that time. The Hydaspes falling into the Akesines loses its name there, the Akesines takes in the Hydraotes, and also the Hyphasis, and retains its name till it falls into the Indus."† Here, we have four large and navigable rivers flowing into the Indus. Of these, the identity of the first three (Hydaspes, Akesines, and Hydraotes) is undisputed; and the fourth, from its name (Hyphasis), and its position with regard to the others, could only have been the Báyás (Vipasa). Where then was the Garrah or Satlej? Had any such river joined either the Chenáb or Indus, it could not have escaped the notice of so many and acute observers as were in Alexander's fleet, or of the numerous writers who afterwards described his voyage. But the Satlej, flowing through Rájásthán and other unknown countries beyond the Hyphasis, would be included amongst those "other rivers" which, as Arrian says, "discharge their waters into the ocean, on this side the Ganges."

Strabo, after describing the same rivers as the writer just quoted, and in the same order, says: "All the rivers which have been mentioned, the *last* of which is the Hypanis, unite in one—the Indus."‡ Here, again, is no allusion to any stream corresponding to the Satlej.

The Arab and other oriental writers of the middle ages ignore

* Travels in Bokhara, III, 287.

† Geog., XV, 1.

‡ Anabasis, VI, 14.

the existence of any such stream as the Garrah. In the Chach-námeh, a translation of an old Arabic account of the first Moslem invasion of India, no mention is made of the Satlej or Garrah, although the Báyás is frequently referred to. The translator of this work lived at Uchh, near the junction of the Chenáb and the Indus, at the beginning of the thirteenth century; and must have been well acquainted with the position of all the rivers of that part of the country.

In the work referred to, we are told that Chach, King of Hind and Sindh, in the seventh century, prepared an army intending to march to the boundary of his kingdom which adjoined the Turk. The astrologers having fixed an auspicious time, he set out from Aror (on the left bank of the Indus, near Bukhar) and after many marches reached the fort of Pabiya, on the south bank of the Báyás. This fort was taken, and Chach then crossed the Báyás and the Ráví, and took Multán.* Here nothing is said of the Garrah or Satlej, although no other river is omitted which now intervenes between Aror and Multán; while the mention of the Ráví, which anciently flowed to the south of the last named city is a proof of the accuracy of the historian.

The same writer in his account of the route of Muhammad Kásim, the Arab conqueror of Sind, (A.D. 712-13) says: "He then marched from that place (Aror) and journeyed till he arrived at the fort of Yabiba (Pabiya) on the south bank of the Báyás." Again we find that "Muhammad Kásim left the fort (Pabiya), crossed the Báyás, and reached the fort of Askalund." After this he crossed the Ráví and took Multán.†

Al Biladuri, who lived some three centuries before the translator of the Chach-námeh, in describing the march of the Arab army, mentions no river between Aror and the Báyás.

The geographer Al Biruni (tenth century) says that the Sind after passing Audar (Aror) bears the name of Mihran, and adds; "In the same way as at this place (Aror) they call the collected rivers "Panjnad" (five streams,) so the rivers flowing from the northern side of these same mountains (Himálaya) when they unite near Turmuz and form the river of Balkh (Oxus) are called the "Seven Rivers."‡

Thus, above its junction with the Chenáb, the Indus was called Sindh; from this point to Aror it was the Panjnad; and from that city to its mouth it bore the name of Mihran.

The Panjnad, therefore, included the Sindh and four other rivers, of which the Satlej could not have been one.

The writer just quoted gives a more detailed account of the

* Elliot, I, 140.

† *Ibid.*, I, 203.

‡ *Ibid.*, I, 149. May not these, and

not the seven rivers of the Panjáb, be the "Hapta Hendu" of the Ven-
didad?

branches of the Indus, than do the other Arab geographers ; but unfortunately, his description of the Satlej and its tributaries is very vague. This vagueness is increased by the translator having endeavoured to make his descriptions agree with modern geography, and to introduce the Satlej amongst the affluents of the Panjnad ; although, as we have just seen, the author distinctly excludes it.

After a description of the Kábul, Swat, and other streams, the translation runs thus : " All these rivers fall into the Sindh near to the fort of Biturashit, at the city of Kandahar which is Waihind. After that comes, from the west, the river of Thibet called the Jhelam. This and the waters of the Chandra unite about fifty miles above Jharawar (Chandrawur?) and the stream flows to the west of Multán. The Beah joins it from the east. It also receives the waters of the Irawa (Ráví). Then the river Kaj flows into it, after separating it from the river Kuj, which flows from the hills of Bhatal. They all combine with the Sutlader below Multán, at a place called Panjnad, or junction of the five rivers."*

The first portion of this description is clear enough, but, with regard to the last two sentences, Sir H. Elliot observes : " There is some confusion here, which cannot be solved by any interpretation of the original. *I have modified the translation*, but the passage is still doubtful. The Arabic differs in some points. It makes no mention of the Chandra ; but as it speaks of the waters being 'collected from many places,' it would seem that the name Chandra has been mistaken for the word chand (several). It is ambiguous about the Kaj, but it seems to say as follows : Then the river Láj separates it distinctly from the river Kut, which is collected from the waters of the mountains of Bhatal, and it joins it where it joins the Sutlader as it descends from Multán."†

From this, obscure as it is, one point at all events seems clear, which is, that the rivers collected from the mountains of Bhatal joined the Sutlader (Satlej). Now the Gaggar and Chitrang receive all the streams flowing from these mountains (the Sewálik range between Satlej and Jamna), one or both of them, therefore, must be referred to under the names Kut and Kaj ; and they both join the Sotra or Hakra.

The Moorish geographer, Ibn Batuta, in describing his journey to Dehli, says : " On the first of the sacred month of Muharram H. 735 (A.D. 1333) we arrived at the river Sind, the same as is called Panjáb, a name signifying ' Five Rivers.' "‡

The Tárikh-i-Háfiz Abru, written in the fifteenth century, but compiled from older writers, says of the Beyah : " This is also a large river which rises to the east of the mountains of Kashmír. It runs into the country of Lahawar, and to the

* Elliot, I, 48.

† *Ibid.*, I, 48.

‡ Elliot, III, 587.

neighbourhood of Uchh. It falls into the sea in the country of Kambaya (Cambay.)"* This account, taken from some ancient work, evidently refers to the Satlej. This river had, long before the time of Háfiz Abru, joined the Bíyáh, by which name the united streams were known. Hence the confusion.

The Emperor Timur says that, on his making enquiry when in Kashmír as to the course of the Panjáb rivers, he was told that, "when this river (Jhelam) passes out of the confines of Kashmír, it is named after each city by which it flows, as the river of Dandana, the river of Jamd. The river passes on and joins the Chenáb above Multán. The united waters pass below Multán and there join the Ráví. The river Bíyás comes down through another part and joins them, and the united rivers fall into the Sindh or Panjáb, and this river falls into the Persian Gulf near Thatta."† Here, as elsewhere, the Satlej is unmentioned; and the "Panjáb" is the Indus below the confluence with the Chenáb.

Ferishta mentions the Nilab (Sindh) as "one of the five capital branches of the Indus."‡

From this evidence it seems clear that the Satlej was not one of the rivers forming the Panjnad, that it lost its name on flowing into the Bíyás, and that, previous to its junction with that stream, it was not one of the tributaries of the Indus. All this shows the correctness of the conclusions already arrived at, viz., that the Sotra or Hakra was the bed of the Satlej, and that its drying-up was owing to its waters having become diverted into the Bíyás valley.

From the junction of its eastern and western arms near Bullur, on the frontiers of Bikanír and Bháwalpur, the Hakra traverses the latter State, where it loses the name of Sotra and acquires that of Wahind (river of Hind).

Near Khángarh on the Sindh border, as already mentioned, the channel turns southward; and, about thirty miles south-east of Rhorí, it becomes continuous with the old river-bed marked in maps of Sindh as Eastern Narra. The Narra or Nala, which also bears the names of Hakra Dhora (old bed of Hakra), Wahind, and Dahan, is to be traced from this point southward, past Umarkot, to the Rann of Kach.

According to a tradition current on the borders of Bikanír, the waters of the Hakra at a place called Kak, south of the Mer country, spread out into a great lake. This was, no doubt, the Rann.§

* Elliot, IV, 4.

† *Ibid*, III, 476.

‡ Dow, I, 139.

§ A people called Kakshas, dwellers by the seashore, mentioned in

the Mahábhárata, are identified by Professor H. H. Wilson with the inhabitants of Kach.—Vishnu Purána, II, 170.

Entering the Rann, the Narra meets the Dhora Purán (ancient channel), the dry bed of what was once the eastern and greater branch of the Mihran or Indus. It is not difficult to understand the formation of the Rann if it be considered as the former embouchure of three important rivers (the Indus, Satlej, and Luni), of which the two first and greatest have long since abandoned it.

The traditions of all the tribes bordering upon it agree that this expanse of salt and sand was anciently an estuary. And as noticed by Burnes,* and still more recently by Sir B. Frere, places are yet pointed out upon its shores which once were ports.

In the Rann we may also recognise the great lake at the mouth of the eastern arm of the Indus, described by Arrain, who says :

“ When he (Alexander) had sailed far down the left branch and was near the mouth thereof, he came to a certain lake formed either by the river spreading wide over a flat country, or by additional streams flowing in from the adjacent lands, making it appear like a bay of the sea. Abundance of sea fish are found there of a much larger size than our seas produce. Steering to a creek to which his pilots directed him, he left there Leonatus with many of the soldiers and all the long galleys ; but he, with some biremes and triremes, passed out at the mouth of the river and sailed into the ocean.”

“ He afterwards made another voyage to the lake, where he ordered a harbour to be made, with other places, for the safety of ships.”†

This estuary, too, is evidently identical with the lake of Ságara in which, according to the Chach-rámeh, the fleet of Muhammad Kásim anchored ;‡ and also with the lake Ash Sharki, upon which Al Biladuri says the fleet of Jaishya, son of Dahir, king of Sindh, was destroyed by the Arab commander Junaid, who afterwards overran the countries to the eastward, penetrating to Bhroch and Ujjain.§

The mention of “ Bala, King of Ash Sharki ” having been killed by Musa Bin Yahya, one of the successors of Junaid,|| confirms the identity of the lake, as Bal or Bali-ka-Rai (the Balhara of the latter Arab writers) was the title of the rulers of the country upon the eastern shores of the Rann.

Although much inferior in size to the Indus, the Hakra must have been of vast importance to such a thirsty region as Sindh ; and the change in its course produced there the same results as further north.

Several points in the history of this country, hitherto not easily

* Travels in Bokhara, III, 323.

† Anabasis, VI, 20,

‡ Elliot, I, 398.

§ Elliot, I, 125.

|| *Ibid*, I, 128.

explained, are cleared up by the discovery that a considerable river once flowed through it to the eastward of the Indus. Thus, the former wide extent of cultivation and existence of flourishing towns, in a tract now arid and sterile, is no longer a subject for wonder. And we can understand the sudden conversion of these lands into a sandy waste, and the migration of the people, driven from their homes by drought and famine, which could not have arisen from any transient cause, as the country has ever since been desert. In the tract once fertilised by this lost river, where old tanks and ruined temples are still to be met with, are now spaces of fifty miles without water, and the wells vary from 70 to 500 feet in depth.*

Native historians of Sindh often allude to the desolation caused by the drying-up of this stream, but from these authorities no precise date can be fixed for its occurrence. The association of the event, however, with the great famine and the exodus from the banks of the Hakra, also with the ruin of the Sumras, and the rise of the Sammas to power, shows that it must have happened in the early part of the thirteenth century, when, as we have already seen, the Satlej finally abandoned its ancient course. It is not known exactly when the Sumras were supplanted by the Samma tribe, but it must have been about the middle of the thirteenth century. Ferishta and other authorities tell us that the Sumras ruled at Debal, or Thatta, when the Sultán Jalál-ud-dín invaded Sindh in A.H. 620 (A.D. 1223).† We also learn from the *Tárikh-i-Másumi* that Unar, first Jam of the Sammas, became ruler on the overthrow of the Sumra dynasty, and that he was killed after a short reign and was succeeded by Jam Juna. This chief who “drove the Turks out of Bakhar and ruled all Sindh,” had reigned thirteen years at the time of Alá-ud-dín’s invasion, in A.H. 697 (A.D. 1296). The accession of Jam Juna was therefore in A.D. 1283, so that the downfall of the Sumras must have occurred between A.D. 1223, and that year; having been preceded by the disappearance of the Hakra river.

Alá-ud-dín’s army, according to the *Tárikh-i-Másumi*, was sent by Ulugh Khán, the Sultán’s brother, then Governor of Multán, and was commanded by Taj Kafuri and Tatar Khán. It soon overran the whole of Sindh.

Jam Juna died at this time, and was succeeded by Tamachi, who was taken prisoner and carried away to Dehli, but was allowed to return to Sindh and resume his government.‡

The following legend, relative to the drying-up of the Hakra, is from the *Tárikh-i-Tahiri*, which was written three centuries after the event described; and when this had evidently become confused

* Annals of Rájásthán, II, 303. † Elliot, I, 224.

‡ Elliot, II, 564.

with the desertion, by the main stream, of the eastern branch of the Indus—the Sind Ságara or Dhora Purán. The historian, whose dates are very incorrect, says: “ From the year H. 700 (A.D. 1300) to H. 843 (A.D. 1439) the Hindu tribe of Sumra were the rulers of Sind; and that portion which is now so flourishing (Thatta) was then a mere waste, owing to the scarcity of water in the Sind or Panjáb river below Bukkar. No water flowed towards those regions (or rather, water was deficient in those lands), and water is the very foundation of all prosperity. The capital of this people (Sumras) was the city of Muhammad Tur, which is now depopulated and is included in the pargana of Dirak. Not I alone, but many others have beheld these ruins with astonishment.” “ The cause of the ruin of the above-named city and its dependencies, which had flourished between nine hundred and a thousand years, was as follows:—Below the town of Alor (Arór) flowed the river of the Panjáb which was called by the names of Hakra, Wahind, Dahan, and by others, for its name changes at every village by which it flows. After fertilizing the land, the river poured its waters into the sea.” The legend goes on to say that Delu Rai, who governed the country between the capital and Aror (which city had then evidently decayed) was a tyrant, and levied large contributions from all traders who passed that way in boats from the country of Hind. At last, a merchant came who had with him, not only very rich stores, but also a beautiful damsel. The latter was of course demanded by Delu Rai. The merchant obtained three days’ respite which he employed in erecting a *band* (embankment) across the river, *below* Aror, by which the course of the stream was turned in the night; and the people of the country, when they awoke next morning, found nothing but mud in the bed of the Hakra. In consequence of this, “ the scarcity of water soon caused the grass and the fields to wither, and death laid its grasp upon men and cattle.” The historian continues: “ When through the tyranny of Delu Rai the river of the town of Aror became dry, the passage of the river came to be made near Sehwan, and that town which is still flourishing became populated.” We are also told that the want of water ruined the lands of the tribe of Sumra, and that the Samma tribe, which had been subject to the Sumras, removed from that country and settled near Thatta.*

This legend is well known in Sindh, but the names and dates vary much, as also does the site of the *band*. The author just quoted, who lived at Thatta, places the embankment below Aror; in Northern Sindh it is supposed to have been at some point

* Elliot, I, 272.

higher up the river ; while still further north, as already mentioned, it is said to have been where the Satlej enters the plains.

The story just quoted brings before us forcibly the suddenness of the catastrophe, and plainly shows that the drying-up of the Hakra was not from any gradual shrinking of the stream, but owing to the diversion of its waters into another channel. As already alluded to, the historian has confused the tradition of the drying-up of the Hakra with some other, relating to changes in the delta of the Indus. One of these, no doubt that of the main stream from the eastern or great Mihran to the western or smaller branch, is said by McMurdo to have caused the fertilization of the lands near Thatta, which were previously barren.

It is not known when this change took place, but Al Biruni, in the eleventh century, describes the eastern as the greater, and the western as the smaller, mouth of the Mihran ; while at the time of the invasions of Muhammad Tughlak and Fírúz Sháh (A.D. 1350 and 1370) the western branch which flowed under Thatta was the main stream. This was so broad that the latter commander could not from the left bank see the battle which was being fought on the opposite shore.*

It may be observed that the legend just quoted does not relate to the destruction of Aror, as it has been supposed to do ; nor can it refer to any change in the course of the Indus. The name of the river was Hakra or Wahind, and the city ruined by its drying-up was Muhammad Tur, the capital of the Sumras, which was situated in the now desert tract, south of Umarkot.

Aror could not have been deserted in consequence of any change in the course of the rivers, as the Mihran, upon which, according to the Arab geographers, it was built, still flows within five miles of its site ; and is much nearer to it than the Hakra ever was.

This ancient capital of Sindh appears to have been supplanted by Bukhar, which was a stronger position, and to have gradually decayed, probably in consequence of repeated plunderings.

McMurdo says, on the authority of the Tofat-al-Girani, that Bukhar was built by the Arabs from the ruins of Aror.† This can, however, be but partially correct, as the latter city is mentioned as a place of wealth and importance by Oriental geographers, down to the eleventh century, and is referred to in the Annals of Jessalmír in S. 1212 (A.D. 1156). It is stated also in the Annals of Mewar that a brother of the Rájput Chief of that State held Aror in S. 1249 (A.D. 1193) as a fief of Gazni, and was succeeded by a younger brother, who became a convert to Islám.‡ After this, Aror is no more alluded to in history ;

* Elliot, III, 332.

† Journal Royal Asiatic Society, No. II.

‡ Can this have been Delu Rai ?

but it was still inhabited at the beginning of the thirteenth century, when it was visited by the translator of the *Chach-námeh*.

Bukhar appears to have been in existence long before the Moslem invasion.

This fortress, according to Tod, was founded by the Pramara Rájputs,* of which tribe the Sumras were an offshoot.

It is most probable that the island fort is identical with Baghrur, which is coupled with Alrur (Aror), by the historians of the Arab conquest of Sindh, as Bukhar is with Rchori to this day, and which is said by the *Chach-námeh* to be a fort situated upon the Mihran, in the country of Aror, and opposite to Budhya.† The latter name was applied to the country on the right bank of the Indus above Sehwan, and separated from Bukhar by the river.

This fort was the chief stronghold of the governors of Sindh, under the kings of Ghazni, and afterwards of Nasr-ud-dín Kubácha, who ended his reign there by being drowned in the Indus H. 625 (A.D. 1228.)

Of Delu Rai, nothing certain is known; but as his capital was Muhammad Tur, he must apparently have been a Sumra. The Hindu title does not seem to accord with the name of his city, but his brother, Chata, is said to have been a Musalmán. Hindu and Moslem names and titles were strangely mixed up in those days.

The portion of the legend relating to Sehwan is manifestly incorrect. The Hakra never flowed near Sehwan. There has been no deficiency of water in the Indus between Bukhar and that city within the range of history, nor any such change as is here described in the course of that river. Sehwan has flourished from the earliest period, and certainly did not become populated at the time of the ruin of Muhammad Tur and the Sumra dynasty.

Local tradition, according to Captain McMurdo, assigns a higher antiquity to this fortress than to Aror or Bráhmaábád;‡ and Colonel Tod mentions that it was held by Bhirtraharí, who was expelled from Ujjain in the first century by his brother Vikramáditya.§

According to the *Tárikh-i-Sindh*, Siwistán (Sehwan) was the capital of one of the four great divisions of the kingdom of Sindh and Hind, in the time of Rai Siharas, || five reigns before that of Dahir which ended in A.D. 712. The mention of this city by

* Annals of Rájásthán, I, 91.

† Elliot, I, 122, 123, 163.

‡ Journal Royal Asiatic Society, No. II.

§ Annals of Rájásthán, II, 333.

|| Known on the northern confines of Sind as Rai Híran. Tradition says that Multán and the ancient fortress of Mhau Mobarak were built by this chief.

Arrian, Strabo, and others, as Sindomana, by the Arab geographers Ibn Kurdabda (A.D. 900), Al Istakhri (A.D. 950), and Ibn Haukal (A.D. 976), as Sadusan, by Al Idrisi (A.D. 1100) as Sharusan, and by all as a place of importance, shows that from the fourth century B.C. to the twelfth century A.D. there was no want of water at Sehwan. Al Idrisi, indeed, says that the city was remarkable for the number of its fountains and canals, and the extent of its commerce.* In the map of Sindh of the Askalul Bilad (A.D. 1193), Sadusan is placed upon the main stream of the Indus. From this time, Sehwan is frequently mentioned as a flourishing place. In A.D. 1350, Sultán Muhammad bin Tughlak, when marching along the banks of the Indus to Thatta, collected a fleet of boats at Siwistán, and twenty years later Fírúz Sháh did the same.

Thus it may be seen that no such change as that alluded to in the legend can have taken place, in the course of the Indus, between Bukhar and Sehwan. The source of the error was evidently the confusion of two separate events, as already alluded to.

The Eastern Narra has been generally considered as the former course of the Indus; and it is marked in Kiepert's map as "Ancient bed of Sindhu." Whether, however, this channel was originally the bed of the Indus or of the Satlej, in it the waters of the Sotra, Hakra, or Wahind flowed through the Sumra lands in the thirteenth century, at which time the course of the Indus had been for ages by Bukhar and Sehwan.

Further, it was not until the drying-up of the Hakra that the country on the banks of the Narra became waste, and was abandoned by its inhabitants.

It is tolerably certain, however, for the following reasons, that the Narra or Hakra was originally the bed of the Satlej; although the flood waters of the Indus have found their way into it in recent times:—

1st.—Not only are the Narra and the Hakra continuous, but the channel is known by the latter name to this day, from Bhatnair to the Rann of Kach.

2nd.—Although many different names are given to the Narra, it is never called Sindh, or Sindh Dhora (old bed of Sindh), but, as just mentioned, it is known as Hakra and Hakra Dhora, also as Wahind. These names, as we have seen, are borne by the old channel of the Satlej.

3rd.—Tradition represents the Hakra as flowing, not into the Indus, but into the sea, to the south of the Mer country;† also

* Elliot, I, 79.

† The Mers or Mhairs, identical with the Meds of the early Arabic writers (Elliot, I, 524), once occupied

a great portion of Sindh and the neighbouring country, and are still widely spread over the tract to the eastward of the Indus.

as spreading out at its mouth into a lake, so wide, that for fifty or sixty *kós* (80 to 100 miles) nothing could be seen but water. This lake could only be the Rann.

4th.—There is no old channel traceable from the Indus to the Narra, but the waters of the former, during the inundation, overflow its banks for a space of fifty miles or more, and spread over the country, finding their way at last into the latter.

When the floods of the Indus are very high, a great volume of water sometimes thus enters the Narra. This was the case in 1826, as mentioned by Burnes, and it has occurred several times since. The Aror canal, excavated a few years ago, also conducts the waters of the Indus into the Narra.

The tract thus subject to inundation is intersected by canals and drainage channels, some of the latter being of considerable size.

The old bed of the Indus, known as Sindh Dhora, is from ten to fifteen miles west of the present course of the river; and consequently so much further from the Hakra.

5th.—The slope of the country, as shown by canals, &c., is from the Indus to the Narra, which is against the supposition that the latter channel was forsaken by that river; while it favours the entrance of the flood-waters into the bed of the Hakra.

6th.—The Narra or Hakra does not form a delta; while, between Aror and the borders of the Rann, it does not approach, nor has it any communication with, the Indus. Therefore, either the Narra could not have been the Indus, or the head of the delta must have been above Bukhar and Aror, which is very much too far north for the situation of Patala.

Arrian mentions that Alexander took Sindomana (Sehwan) before he reached the delta. And according to Ptolemy, the river divided half-way between its mouth and the capital of Oxykanus. This city, which was several days' sail below the junction of the Chenáb with the Indus, has been identified by Major-General Cunningham with Mahorta, near Larkana, forty-five miles west of Aror.* From this it is clear that the head of the delta could not have been above the latter city.

Moreover, all the old geographers agree that the Mihran divided near to, and above, Mansura, and that this capital was several days' journey south of Aror. Al Istakhri and Ibn Haukal place this latter city half-way between Multán and Mansura; so also it is laid down in the map of the Askal-ul-Bilad. Al Idrisi says the distance from Aror to Mansura is seven days. The head of the delta, therefore, must have been a long distance south of Aror. In fact, the old

* Ancient Geography of India, I, 260.

bed of the eastern arm of the Indus still exists to the west of the Narra, in the position ascribed to it by the writers named.

7th.—No allusion is made by any of Alexander's historians to a large river, such as the Hakra, entering the Indus below the Akesines ; although, with an army marching along the bank, such a junction could not have been overlooked.

8th.—Rai Chach and Muhammad Kásim, the former in the seventh, and the latter in the eighth century, crossed no river in marching from Aror to Multán till they reached the Bíyás.

9th.—Sehwan has flourished probably from the time of Alexander, but certainly from the reign of Rai Siharas, in the sixth century, to the present time. This could not have been the case, in a rainless region, if the Indus had been flowing in the Eastern Narra, between sixty and seventy miles distant. Further, the Chach-námeh tells us that when Muhammad Kásim laid seige to Sehwan (A.D. 712) the river Sindhu flowed on the northern side of his camp.* Whether this refers to the main stream or to its branch, the Aral, signifies little, as the latter has no connection with the Eastern Narra, and could not have been in existence had the Indus not flowed in its present course.

10th.—The name (Muhammad Tur) of the city which was ruined by the drying-up of the Hakra, and its having been the capital of the Sumra dynasty, which lasted from about the middle of the eighth to the latter part of the thirteenth century,† show that this event happened long after the conquest of Sindh by the armies of Islám. At that time the course of the Indus is known to have been to the west of Aror.

Thus, if the Eastern Narra was ever the bed of the Indus, it must have been previous to the time of Alexander. While the Sutlej, as we have seen, continued to flow in this channel as late as the thirteenth century.

Much interesting information as to the rivers of Sindh may be gathered from the description of the marches of the army under Muhammad Kásim. We learn from Al Biladuri, that the Arab commander before reaching Nirun(Haidarábád) crossed a river "on this (west) side of the Mihran."‡ And, according to the Chach-námeh, after staying some days at Nirun, he determined to go to Siwistán, and, having captured it, to *re-cross* the river and proceed against Dahir.§ That this also was the "river on this side the Mihran" is evident, as Nirun was to the west of the main stream of the Indus, which had not yet been crossed.

Having taking Siwistán, Sisam, and the country opposite the fort of Baghrur (Bukhar?) on the Mihran, Muhammad Kásim received orders from Hajjaj to return to Nirun, take measures

* Elliot, I, 159.

† Elphinstone's History, 312.

‡ Elliot, I, 121.

§ *Ibid*, I, 158.

to cross the Mihran, and to fight with Rai Dahir. The Arab commander again arrived at Nirun, when he collected boats, and, having constructed a floating bridge, he crossed the Mihran. After several marches the army came to Jewar or Jaipur on the banks of a stream called by the Arab writers Wadhawah or Dadhawah, near which a battle was fought and Rai Dahir was killed.*

The fort of Rawar, the residence of the King of Sindh, was built upon this river, which was navigable both above and below it, for Muhammad Kásim directed Nuba, son of Daras, to hold the place and keep the boats ready, and if any boat coming up or down the river was loaded with men or arms, to take them and bring them to the fort. "And he placed the boats on the upper part of the river under the charge of Ibn Zyad-ul-Abdi."†

This Wadhawah or Dadhawah was evidently the Hakra which bore amongst other names those of Wandanwah and Dahanwah.

The Mihran or main stream of the Indus at that time was the channel now known as Dhora Purán. And the "river on this side the Mihran" must have been the eastern and then smaller branch of that stream.

Elphinstone has placed Rawar and the scene of Rai Dahir's defeat upon the Indus, the existence of the Hakra as a separate river not having been known; but the Chach-námeh distinctly says that the fort was built, and the battle was fought, on the banks of the Wadhawah or Dadhawah, and that this was several marches beyond the Mihran.‡

The Dhora Purán may be traced, under different names, from above Halla to the Rann of Kach. There can be no doubt that, as observed by Pottinger,§ this was the eastern branch of the Indus down which Alexander sailed to the great lake and to the sea.

This also was evidently the eastern or greater arm of the Mihran, described by Rashid-ud-dín as branching off from above Mansura to "the east, to the borders of Kach," and "known by the name of Sindh Sagara."||

This ancient river-bed is also identical with the Sankra Nala which was constituted by Nádir Sháh the boundary between his dominions and those of the Emperor of Dehli.

On the east bank of this channel are the ruins of Bráhmaábád, the ancient capital of Sindh; and on the west was built its famous successor Mansura, upon the site of which, in the fourteenth century, was founded the still later Nasirpur.

The Dhora Purán, therefore, was the Mihran of Muhammad Kásim; and to the eastward of this flowed the Wahind Sagara, Hakra, or Dahanwah.

* Elliot, I, 170.

† *Ibid.*, I, 189.

‡ *Ibid.*, I, 168, 172.

§ Journal Royal Asiatic Society, No. II.

|| Elliot, I, 49.

The term Sagara being applied to both rivers has led to some confusion. Thus, in Sir H. Elliot's manuscript of the Chach-námeh, the Wahind Sagara is mentioned as the stream up which Muhammad Kásim sent his mangonels in boats towards Nirun, when the Sind Sagara, as given in the other MSS., is evidently intended.

Sagara, of which, as already mentioned, Hakra is a corruption, appears to have been rendered by some of the early Arab writers, literally, as "Sea" (bahr or bahera.) Thus Al Biladuri tells us that the famous city of Mansura, which was between two branches of the Indus, was built on this (western) side of the sea of Sindh (Sindh Sagara?), and the fortress of Mahfuza on the other side facing Hind.* This has, doubtless, puzzled commentators in their endeavours to identify the sites of these and other ancient cities mentioned by the historians of the early Moslem invasions.

The course of the lost river has now been traced from the Himá-layas to the sea. Probably, with more extended enquiry, much additional information on the subject might be elicited. Sufficient evidence has, however, been brought forward to show that the Hakra did not dry up in consequence of any diminution of rainfall or failure of its source; but that its waters, having ceased to flow in their ancient bed, still find their way by another channel to the ocean.

It has also been demonstrated that the missing river was not the Gaggar, nor the sacred Saraswatí, nor yet a mythic stream, but was no other than the well-known Satlej; and that the river below Ferozepore, now known by that name, is the Beah, the ancient Vipasa, the Hyphasis of the Greeks.

In addition to this, it has been pointed out that the mysterious disappearance of the Saraswatí, in the sands of the desert, was the result of one of the earlier changes in the course of the "Lost River."

* Elliot, I, 126.

INDIAN RAILWAYS:

THEIR

PAST HISTORY,

PRESENT CONDITION, AND FUTURE PROSPECTS.

BY

JULAND DANVERS, Esq.,

GOVERNMENT DIRECTOR OF THE INDIAN RAILWAY COMPANIES.



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PREFATORY NOTE.

THE following is the reprint, with a few trifling additions and alterations, of a paper which was read at the Society of Arts at the request of the Indian Committee of the Council. It has been published in this form with the permission of the Society, and at the suggestion of several of its members, in consequence of representations that more applications than could be complied with had been made for the number of the Society's Journal which contained the paper.

In the Appendix will be found the opinions of Mr. R. W. Crawford, Chairman of the East Indian Railway Company; the Earl of Northbrook, late Viceroy of India; and Mr. Hyde Clarke, Chairman of the Indian Committee of the Society of Arts, as expressed subsequently to the reading of the paper.

19th March, 1877.

INDIAN RAILWAYS.

It is needless to dwell upon the importance of applying to every country that most necessary of all aids to material development, the formation of communications. It may be laid down as an axiom that the nation which has been best provided with the most suitable means of conveyance, within and without its territory, has made the greatest advance in civilisation and prosperity.

There are two ways by which communications may be carried on, viz. by land and by water. In many places, and for many purposes, rivers and canals afford the readiest and cheapest mode of internal transit; but the former are only available, and then only when navigable, for places situated on or near their banks; the latter can only be constructed when the water is at hand to fill them, and where the gradients of the country favour its flow. The great advantage of land communication is that it can be formed wherever it is wanted; that it can unite towns and military posts by the shortest routes; that it ensures speed and punctuality, and that it is more free from interruptions. Many important towns and many districts, rich in mineral and agricultural produce, would be cut off from each other, and from their nearest port, if they depended upon water. Even where rivers exist it has been found necessary to construct railways. In England no new canals have been cut since railways were

Canals and
Railways.

introduced, and some canals have been converted into railways. The establishment of flotillas of steamers on the navigable parts of the Thames, Rhine, Seine, and other rivers, did not prevent the necessity for constructing railways along their banks. In India we have the example of the Indus. For some time it was attempted to carry on the traffic between the port of Kurrachee in Scinde, and Lahore in the Punjab, by the joint instrumentality of the two railways in those provinces, and the flotilla on the river between Kotree and Moultan, but the navigation was difficult, slow, and perilous, and the service was inadequately performed. It has, therefore, been superseded by a railway.

The object of these prefatory remarks is simply to point out that India would have been deprived of an important and necessary aid to advancement if she had not been supplied with railways. I do not for a moment wish to imply that canals are not equally important and necessary in their proper place, or that there is really any rivalry between canals and railways in that country. There should, on the contrary, be close alliance and well-arranged co-operation. By the judicious combination of the two the future resources of the country would be found incalculable. The one will fertilise the land, the other will carry the produce where the river or canal cannot take it. An enormous amount of virgin soil would be brought into cultivation; the failures of crops would not be of such common occurrence as they are now, and, if scarcity were to prevail in any districts, the products of more favoured parts of the country could be conveyed to them. Famines, in fact, would not be known, and the general wealth, prosperity, and comfort of the people would be promoted. We have already had instances where canals and railways have gone hand in hand to avert suffering and famine. The scarcity which followed the drought in the

North-West Provinces, in 1860, and in Bengal in 1874, would certainly have been accompanied by famine if it had not been for the joint action of canals and railways.

Before describing the railways of India and their effects, it may be useful to take a glance at the country anterior to their establishment. Any history of the material progress of India may well be divided into a pre-railway and a post-railway period. Since their introduction India has made great strides, partly through their instrumentality and partly through contemporaneous causes. For some time after British supremacy had been acknowledged, little was done in the shape of forming good and reliable communications. Fifty years ago the highway from Calcutta to the North-West Provinces was the river. The interesting journals of Bishop Heber and other travellers of those days describe the time occupied and the dangers and difficulties encountered on the journey. Any attempt to go from Southern India to Delhi or Lahore by land was not thought of. The physical features of the country offered difficulties which were wellnigh insurmountable by the ordinary traveller. It would have occupied him months, nay, probably, years, for he could only move with comfort and safety to health in the cool season. Now it could be accomplished with ease in a week or ten days. Within the period I have mentioned—*i. e.* in 1830—Sir John Malcolm, then Governor of Bombay, was opening for the first time a cart road which had been made up the Bhore Ghât, and spoke of it as a work which was “to break down the wall between the Concan and the Deccan.” It was regarded as a magnificent engineering feat. What would have been thought, by those who rejoiced on this occasion, of the railway which, within the period of a generation after, was taken over the same barrier and opened by

State of
the country
before the
introduc-
tion of
railways.

Malcolm's worthy successor, Sir Bartle Frere, amidst a similar flourish of trumpets? There were obvious reasons why we were backward in prosecuting public works in India. Wars, internal commotions, our political relations with native states, the settlement of newly acquired territory, occupied and engrossed the attention of the Government and its officers. The want of money also, and the absence of suitable materials for road-making, especially in the Bengal Presidency, were serious impediments. It must, however, be admitted that there was wanting that recognition and due appreciation of the importance and value of well-chosen public works which characterises our administrators of the present day. It was not unnatural, therefore, nor without some cause, that, in answer to observations which were made on the scarcity of communications, the authorities dwelt upon the fact that for a third of the year the whole country might be regarded as a road, that they made the most of the few hundred miles of pukka road which existed, and argued that for general use fair weather tracks only were required.

As the political atmosphere became clearer and quieter, a stronger sense of the necessity for extended communication was entertained, and a systematic commencement was made with roads and with works of irrigation. Just as railways were on the eve of being introduced, several well-constructed highways had been established, and canals had been cut. In 1850 about 3200 miles of metal trunk roads, and 1800 miles of canal were in existence. This, of course, was a mere scintilla of what was required, and was by no means commensurate with the social and commercial wants of the community.

First introduction of railways.

Up to this time the question of introducing railways into India had only formed the subject of discussion and controversy. Railways, after all,

are nothing more than the best known means of carrying on communication by land. But what with prejudice, timidity, and a dread of spending money beyond the usual limits of military and naval establishments, civil administration and jails, there was considerable difficulty in persuading some persons even to believe that railways were good for India. The first serious proposal to introduce them was, curiously enough, treated almost with derision by some of those who were, or who were thought to be, the best judges of the country and people. "The railways," said they, "might possibly be made; but the natives would not use them." Then came the bugbear of physical obstructions, and after that the money difficulty. All this may appear to us frivolous and weak, but *tempora mutantur*. Now things are different. Then the irresistible force of facts and examples used by men of energy and perseverance like Macdonald Stephenson, John Chapman, W. P. Andrew, and others, as well as by some in the service of Government who were fully alive to the importance of the work, were required to bring the matter to a point.

When at last it was decided that railways should be made in India, it is not to be wondered, after all that had occurred, that the first step was a cautious and tentative one. It was a question whether the lines decided upon should be taken in hand by the State itself or by joint-stock companies. Unaided private enterprise not being forthcoming, the latter agency involved the necessity for State assistance and control, and all the inconveniences and complications of a double system. It, nevertheless, had its advantages. The chief reasons for preferring it were that Government was doubtful of its own power to undertake works of this character; that objections were entertained in those days to the raising by the East India Company of money for such purposes in England; that it was

The
guarantee
system.

desirable to introduce into India private enterprise in some shape, even although its spirit might be damped by the guarantee of a certain return on the capital embarked; and that a permanent body like a London company could be better depended on for the appropriation of funds specially raised for a railway than the Government itself. The Board of Control were very strongly in favour of employing companies; the Court of Directors were not so. But it was plain that more delay would occur if some agreement was not come to, and all were now anxious to see a commencement made. It was accordingly settled, after a prolonged negotiation with the East Indian Railway Company and the Great Indian Peninsular Railway Company, that an experimental line of about 100 miles in Bengal should be committed to the former, and of 50 miles in Bombay to the latter. Interest at the rate of 5 per cent. per annum was guaranteed on £1,000,000 for the line from Calcutta, and on £500,000 for that starting from Bombay. A complete Government control over the proceedings of the companies was provided, and such provisions made for giving a share of profits to shareholders in the event of successful management, as, it was hoped, would counteract the enervating effects of an assured minimum rate of interest. I do not propose to discuss at any length the merits or demerits of this arrangement. I know that the policy which dictated it has been objected to; that the guarantee system is regarded by some with aversion, and that it has been condemned. I rejoice that the necessity no longer exists for resorting to it, but, with all its objections, it was on the whole the most practicable one at the time. The delays and failures which had occurred in operations undertaken by the Public Works Department, the habits which had been acquired of commencing works and mak-

ing no provision for completing them, the reversal by one superintendent or commissioner of a district of the policy of his predecessor, all concurred to show that the organisation of the department was not such as qualified it to take in hand the railways of the country. The financial difficulty was greater still. The only sure way of raising money as it was wanted, and of securing its application to the object in view, was through the instrumentality of companies. This alone was an immeasurable advantage, and has been acknowledged as such by many who are most opposed to the system. It will readily be understood that any uncertainty in obtaining funds and any irregularity in supplying money while works are going on are fatal to progress and economy. I have only further to say that Lord Dalhousie, who, besides his powers of administration, was not a man to do anything without good reasons and without much reflection and deliberation, recommended the employment of guaranteed companies for carrying out his scheme of main lines, and that I believe this scheme would not have been brought to its present state of completion under any other plan. After Lord Dalhousie's recommendations arrived in Leadenhall Street, much remained to be done. I happened to be behind the scenes, and witnessed the difficulties as they cropped up one after another, and it was fortunate for India that there were men at hand like Lord Broughton and *Sir Charles Wood, Sir James Melvill, Sir James Hogg, and Mr. James Wilson, who, with willingness to drop minor points of difference, had the practical sagacity to arrive at conclusions by which the object they all had at heart should be accomplished. I feel bound, before leaving this part of the subject, to do justice to the Boards in this country for the useful part they have

* Now Lord Halifax.

taken, not so much as representative bodies as constituted agencies, in carrying out these works. They were created, it should be remembered, at a time when more was known about railways in England than in India. By an admixture of Indian knowledge and English experience among the Directors, aided as they were by the highest engineering skill this country could produce, they were enabled to do the necessary work in this country and to give directions to their agents in India in a more satisfactory manner, probably, than could have been done by any Government department.

System of
railways
decided
on.

The trunk railways proposed by Lord Dalhousie were selected with the view of securing the greatest political and commercial advantages. Commencing in the south at the port of Beypoor, on the western coast, a line stretches across to Madras, with branches to the foot of the Neilgherries and to Bangalore. A line proceeds thence in a north-westerly direction to Bombay, and from that city crosses the central provinces of India *via* Jabbalpur to Allahabad, throwing out a branch to Nagpur. At Allahabad it meets the great line which extends from Calcutta to the north-west frontier, *via* Agra, Delhi, and Lahore. A line was also laid out commencing from Bombay and going north, its ultimate terminus being Delhi. This latter line has only proceeded at present so far as Ahmedabad in a northerly direction, but a metre gauge State line has been brought down to Ajmere from Agra and Delhi, the important gap between Ajmere and Ahmedabad being in the category of those which have been sanctioned, and are about to be commenced. Lord Dalhousie described this line as of the "greatest political and commercial value" more than twenty years ago. It certainly has not diminished in value since that time, and in addition to the objects just mentioned,

the prevention of a repetition of famine in the districts through which it will pass may well be borne in mind. Famines have cost, and one at this moment is unhappily costing, the country millions. Money disbursed on these occasions is necessarily spent hurriedly, lavishly, and perhaps wastefully, whereas, if applied to canals, irrigation works, and railways, well chosen and economically constructed, it would afford better means of relief when scarcity occurred, and would produce revenue to the State out of the increased traffic receipts which famines cause. As an illustration of this, I have only to refer to the traffic on the East Indian Railway for the years preceding and following the scarcity of 1874. The total amount received in 1873 and 1875 together, from the class embracing grain, was £1,331,400. In 1874 it was £1,385,000, or more than double the average of the other two years. The amount of grain moved to the famine-stricken districts was 800,000 tons.

The gauge fixed upon for the original trunk lines was five feet six inches. It is easy to be wise after the event and to be critical when experience has been gained. It does not, therefore, show any particular sagacity to say of Lord Dalhousie's grand scheme that, in some cases, the alignment might have been more suitable, and that it would have been better if the gauge of English lines (as was proposed by the Court of Directors) had been adopted. Lord Dalhousie himself would probably have said the same if he were now alive. At that time the Court of Directors were thought to be rather behind the age in proposing so old-fashioned a gauge as the four feet eight inch; and in India the question was, not whether five feet six inches was wide enough, but whether six feet would not be better. The five feet six gauge was, in fact, a compromise.

Com-
mencement
of opera-
tions.

river
crossings.

A decided and determined commencement was thus made in the work of constructing a comprehensive scheme of railways, which should provide India with main lines of communication, and form a basis for future ramifications. With the exception of the larger rivers and the Western Ghâts, the natural features of the country did not present very serious difficulties; although in crossing the extensive plains and feverish valleys, wild, inhospitable, and unhealthy tracts had to be penetrated. The engineering obstacles just referred to were, however, of no ordinary character. I have already alluded to the lines which were taken over the mountain barrier separating Bombay from the Deccan, the first running parallel with, although at an average of some fifty miles from, the coast for many miles. The works on these ascents are magnificent monuments of engineering skill and perseverance. The crossing by the Thull Ghât on the North-Eastern line of the Great Indian Peninsula Railway is 1912 ft. above the level of the sea; that by the Bhore Ghât, on the South-Eastern line, is at an elevation of 2037 ft. The Thull Ghât incline is nine miles in length; the steepest gradient is 1 in 37, for upwards of four miles; the sharpest curve is 15 chains radius, for 20 chains 50 links; the length of tunnelling is 1962 yards. The Bhore Ghât incline is fourteen miles in length; its average gradient, 1 in 48; its steepest gradient is 1 in 37 for 1 mile 38 chains, and 1 in 40 for 8 miles 6 chains; its sharpest curves, one of 15 and two of 20 chains radius; its length of tunnelling, 1 mile 44 chains. The cost has been at the rate of from £50,000 to £60,000 a mile. These were formidable and expensive works; but the rivers of India are what have puzzled and thwarted the engineer, and upset his calculations, more than anything else. Bridges have been broken down

and swept away by the floods, and their foundations, even when laid 60 feet below the bed of the river, have been undermined by the water. We have very little idea, in this country, of such tremendous forces, and they were scarcely expected in India; at any rate, they were not understood. The shifting character of these streams has also been a source of expense and trouble. While the bridge over the Sutlej was being constructed, the river, which had been flowing for eighty years along the north side of the valley, changed its course to the south, and the length of the bridge had to be increased in consequence from 4000 feet to 6200 feet. At Goalundo, also, the terminus of the Eastern Bengal Railway, notwithstanding that £100,000 had been expended on protective works, the ground on which the station buildings stood disappeared in the course of a week, and was carried down by the two great rivers which here meet to be added to the deposits at their delta. The bridges which carry the East Indian Railway over the Jumna, at Allahabad and Delhi, and over the Soane, are magnificent structures and have remained firm and safe since they were put up. A list of the principal bridges and their dimensions is given in a table appended to this paper. They are constructed generally of iron girders placed on well foundations made of stone, brick, or iron cylinders. The railroads are constructed generally with a single line only. Out of a length of 6760 miles now open, about 800 miles only are double. The original gauge was, as I have already stated, five feet six inches. A narrower gauge of the width of a metre has since been introduced, and many of the State lines, as well as the South Indian Railway Company's system, are made on the smaller scale. I will only venture to say one word on this very controversial point. The object of adopting the narrower gauge was to

Descrip-
tion of
works.

ensure economy, and to enable India to be supplied with an extended system of railways at the cheapest possible rate, it being a question in some cases whether there should be light narrow gauge lines or none at all. At the same time, care should be taken to apply the diminished size to lines to which the break of gauge would be comparatively harmless. I may be allowed to add, in passing, that the lines of this description over which I travelled in India were as steady and smooth as the others, and that there need be no apprehension as to their not being easy and comfortable if properly worked. The rails vary in weight from 84 lbs. to the yard for the broad gauge to 40 lbs. for the narrow. Latterly, in consequence of the cheapness of steel, many rails have been sent out of that material. Iron is used for sleepers where the soil is suitable for packing. Incredible as it may seem, India failed to supply wood for its own sleepers, and it has been found necessary and more economical to send out Baltic wood creosoted than to use that grown in the country. The materials sent from this country to India for the railways include all the iron and machinery, as well as stores of every description. Even grease for lubricating purposes has been sent out; but country oil is now universally used. The weight of these materials had reached to about 5,250,000 tons, and their value amounted to £35,000,000 up to the end of last year. All this had been sent out since 1850. In the early stage of operations, one great difficulty was the inland transport of this mass of dead weight, and a large outlay was incurred in the process. The ease with which this is now performed is an enormous aid to the progress of future lines.

First open-
ing and
gradual
progress.

The first railway in India was opened in April, 1853, the last by H.R.H. the Prince of Wales, in December, 1875, when at Madura, in Southern India. The line first opened started from Bombay

and went to Tannah, a distance of 22 miles. The next year it was extended a length of 13 miles to Callian, near which place the line bifurcates, and proceeds over the two ghâts in south-east and north-east directions. In the same year the first thirty-seven miles of the East Indian Railway, extending from Calcutta to Raneegunj, were opened. In 1855, a length of 171 miles had been completed, $120\frac{1}{2}$ in Bengal, and $50\frac{1}{2}$ in Bombay. The next year Madras contributed 65 miles. Five years afterwards, the mutiny having intervened, 836 were open, including 368 of the East Indian, 297 of the Great Indian Peninsula, 35 of the Bombay and Baroda, and 136 of the Madras. In 1861 the Scinde line from Kurrachee to Kotree (105 miles) was opened, as well as 49 miles of the South Indian, and in the following year 110 miles of the Eastern Bengal, and 15 of the line from Calcutta towards the Mutlah were finished. In 1862 the first narrow gauge and lightly constructed line was opened, joining Moorshedabad with the East Indian Railway at Nulhati. By this time the East Indian Railway Company had completed upwards of 830 miles, the Great Indian Peninsula 495, the Madras 447, and the Bombay and Baroda 185, making altogether 2352 miles. Progress for the next five years proceeded at the rate of about 200 miles a year, and in 1865 3368 miles were open for traffic. Many of the lines were still disjointed, and through communication between the principal cities and the seats of the various Governments had yet to be completed. The year just mentioned was, however, memorable for the completion of the splendid bridge over the Jumna, at Allahabad, and through it of a continuous line of 1020 miles from Calcutta to the left bank of the Jumna at Delhi. In the following year that city was connected with the railway by the bridge across

the river. In the year 1870 the completion of the last section of the North-Eastern line of the Great Indian Railway enabled the whole line between Bombay and Calcutta to be opened for traffic. The distance by the route then established was 1470 miles. This was reduced to 1400 in the following year, when the Chord line of the East Indian Railway was finished. In 1871 the line across the southern part of the peninsula joining Bombay with Madras was completed. The opening of the last section of the Punjab and Delhi line also established uninterrupted railway communication between Calcutta and Lahore and Moultan, and thus was the system of trunk lines laid down by Lord Dalhousie carried to completion.

tate lines. About this period a new system was introduced. Instead of employing companies to take in hand certain lines of railway which were considered indispensable for the due development of the commerce of the country, as well as for its security, the Government took upon itself their construction. Thus the Indus Valley, the Northern Punjab, and the Rajpootana Railways were commenced. It was at this period also that the metre gauge was adopted and applied to several of the undertakings. These measures were taken during the Viceroyalty of Lord Lawrence and Lord Mayo. The Indus Valley and the Northern Punjab Railways, which were commenced with the narrow gauge, have, under the instructions of Lord Salisbury, been altered and constructed on the standard gauge of 5 ft. 6 in.

Upwards of 5000 miles of railway were in 1871 open in India. In the five years which have followed, that length has been increased to 6760, principally by the system of lines in the provinces of Oude and Rohiklund, 542 miles, on the standard gauge; by the lines from Delhi and Agra going south through Rajpootana by Ajmere, which have been

constructed on the metre gauge, and are worked by the State; and by 520 miles belonging to the South Indian Railway Company, whose system, also constructed on the metre gauge, will extend from Madras to Tuticorin, and include the line formerly called the Great Southern of India Railway, going from Errode, on the Madras Railway, *viâ* Trichinopoly to Negapatam.

It is well known that, under the contracts with the companies, the Government have the power to purchase the undertakings on certain specified terms, the amount to be paid at the time of purchase being regulated by the average price of the stock during the three preceding years, and the sum so arrived at being payable at the option of the Government in a lump sum or in the shape of an annuity, payable half yearly in London, “to be reckoned from the time when the gross amount would be payable, and to continue during the residue of the term of ninety-nine years, the rate of interest which shall be used in calculating such annuity being determined by the average rate of interest during the preceding two years received in London upon public obligations of the East India Company (now of the Secretary of State in Council), and which shall be ascertained by reference to the Governor and Deputy-Governor of the Bank of England for the time being.” This arrangement as to an annuity payment does not apply to the South Indian and the Oudh and Rohilkund Companies. In their cases the Government have the option, instead of paying a gross sum, to transfer to them “such an amount of 5 per cent. Government of India Stock, redeemable at par at the option of such Government, as shall, taking such stock at par, amount to the sum which the Secretary of State in Council would have had to pay if he had chosen to make the payment in cash.”

Power of Government to purchase guaranteed lines.

Terms and periods of purchase.

Subjoined is a list of all the railways, small and great.

	Gauge.	Length of Line sanctioned.	Total length opened.	Portion laid with Double Line.	Length remaining to be finished.	Capital Cost.
	ft. in.					£
GUARANTEED.						
East India Main line ... }	5 6	{ 1,280	1,280	414 $\frac{3}{4}$	...	27,200,000
Jubhalpur line..... }	5 6	{ 223 $\frac{3}{4}$	223 $\frac{3}{4}$	...	...	3,300,000
Great Indian Peninsula ...	5 6	1,278 $\frac{3}{4}$	1,278 $\frac{3}{4}$	327	...	23,500,000
Madras.....	5 6	856 $\frac{3}{4}$	856 $\frac{3}{4}$	...	...	10,250,000
Bombay, Baroda, and Central India }	5 6	408	408	21 $\frac{2}{3}$	...	7,750,000
Scinde, Punjaub, and Delhi	5 6	663 $\frac{3}{4}$	663 $\frac{3}{4}$	4 $\frac{1}{2}$	...	11,000,000
South Indian	3 3 $\frac{3}{8}$	617 $\frac{3}{4}$	527 $\frac{3}{4}$	...	90	3,700,000
Eastern Bengal	5 6	159 $\frac{3}{4}$	157 $\frac{1}{2}$	...	...	3,000,000
Oudh and Rohilkunde.....	5 6	711	542 $\frac{3}{4}$	...	168 $\frac{1}{4}$	5,500,000
STATE.						
Nalhati.....	4 0	27 $\frac{1}{2}$	27 $\frac{1}{2}$	...	...	30,000
Calcutta and South-Eastern	5 6	28	28	...	...	690,000
Northern Bengal	3 3 $\frac{3}{8}$	358 $\frac{1}{2}$	...	...	358 $\frac{1}{2}$	} Unfinished.
Punjaub Northern	5 6	267 $\frac{1}{2}$	62	...	267 $\frac{1}{2}$	
Indus Valley	5 6	508	...	...	508	
Rajputana (Agra and Delhi to Nasirabad)...	3 3 $\frac{3}{8}$	402	402	...	...	2,500,000
Neemuch (Indore to Neemuch)	3 3 $\frac{3}{8}$	302 $\frac{1}{2}$	...	...	302 $\frac{1}{2}$	} Unfinished.
Indore to Khandwa (Holkars).....	3 3 $\frac{3}{8}$	85 $\frac{1}{2}$	57	...	28 $\frac{1}{2}$	
Patri branch of Bombay, Baroda, and Central India Railway	5 6	22 $\frac{1}{2}$	22 $\frac{1}{2}$	...	...	} Unfinished.
Wurdha Valley	5 6	76	18	...	58	
Tirhut	3 3 $\frac{3}{8}$	93	44	...	49	
Rangoon and Irrawaddy Valley	3 3 $\frac{3}{8}$	371	...	...	371	
Sindia (Agra to Gwalior)	5 6	72	...	...	72	
West Rajputana	3 3 $\frac{3}{8}$	314 $\frac{3}{4}$	...	...	314 $\frac{3}{4}$	
Magpur and Chattisgarh...	3 3 $\frac{3}{8}$	123 $\frac{1}{2}$	...	...	123 $\frac{1}{2}$	
BERAR.						
Khamgaon	5 6	7 $\frac{1}{2}$	7 $\frac{1}{2}$	...	...	48,600
Amraoti	5 6	5 $\frac{1}{2}$	7 $\frac{1}{2}$	...	...	30,600
NIZAM'S GOVERNMENT.						
Wadi to Hyderabad and Secunderabad	5 6	121	121	...	...	1,150,000
PROVINCIAL.						
Muttra and Hathras	3 3 $\frac{3}{8}$	30	30	...	...	93,000
Total.....	...	9,415 $\frac{3}{4}$	6,764	768	2,651	

The following are the dates at which the different railway companies may receive six months' notice of the intention of Government to purchase.

The East Indian main line	15th February,	1879.
" " Jabalpur line	21st April,	1883.
Great Indian Peninsula.....	17th August,	1899.
Madras	1st April,	1907.
Bombay, Baroda, and Central India	1st May,	1905.
Scinde, Punjab, and Delhi.....	1st January,	1885.
Eastern Bengal	30th July,	1883.
South Indian.....	1st March,	1890.
Oudh and Rohilkund	2nd August,	1887.

It will be easily understood that all these great undertakings have not been carried out without much human exertion, both of mind and body, and without a large expenditure of money. The professional work done by the engineer, both civil and military, has not been light. He not only had to overcome the natural physical difficulties of the country, to which allusion has already been made, but he had to submit to a hostile climate and to the pestiferous vapours of the jungle. The labour at his command was inferior to what he had been accustomed, and at first was difficult to manage. Separated sometimes hundreds of miles from headquarters, and frequently 30 or 40 miles from the nearest European habitation, he had to depend on his own resources in a great measure and to make the best of poor materials. The way-side graves bear evidence to the loss of many a valuable life. The Mutiny overtook many more while helplessly engaged in the execution of their work, and on a single tablet in the Memorial Church at Cawnpore I counted the names of nineteen engineers who had fallen by the hands of the mutineers. I could not help thinking that these men died as nobly as if they had fallen in the field of battle. Some indeed did good service. It will not soon be forgotten how, at the famous defence of Arrah, Boyle and others connected with the staff of the East Indian

Work of
the engi-
neer.

Railway, in company with Wake and his companions, succeeded in keeping the enemy at bay until relieved by Sir Vincent Eyre.

Engineers
and officers
employed
on railway
operations.

Besides the well-known names of Berkly, Bruce, Brereton, Brunton, Campbell, Graham, Harrison, Le Mesurier, Bradford-Leslie, Logan, Manning, Mathew, Prestage, Purdon, Purcell, Rendel, Sibley, Turnbull, Hardy Wells, and Barton Wright, who were in the service of the companies, the distinguished corps of Royal Indian Engineers contributed some of its most able men to the work. There were Baker, Beadle, Chesney, Crawford, De Bourbel, Davidson, Dickens, Drummond, Greathed, Hancock, Johnson, Luard, Kennedy, Pears, Peile, Pollard, Killow - Pye, Rivers, Stanton, Shaw-Stewart, Strachey, Taylor, Trevor, Yule, and White, all of whom have been some time or other engaged in railway work or administration. It may be safely said that India will never cease to feel the effects of their labours.

Cost.

We now come to the cost, the capital cost, of these 6760 miles of railway, with their 700 stations, 1400 locomotives, and 30,000 vehicles of all kinds. It will be convenient, first of all, to define what the capital is which I propose to take as representing expenditure on this head. I do not include in it the guaranteed interest which has yet been unpaid by the companies ; nor the loss incurred by Government by the fixed rate of exchange ; nor the price of the land ; although it must be admitted the two latter have formed a real part of the cost of the works. The loss by exchange has been a contribution by the Government, and has amounted altogether, after making deductions for gains, to something like £2,000,000. It came to pass in this way. When the contracts were entered into, the rate of exchange for the rupee was 1s. 10d., and it was stipulated that for every

Loss by
exchange.

22d. received by the Government in England they should advance to the companies a rupee in India. The value of the rupee gradually rose, however, as the railways advanced, and at length the Government found themselves giving a rupee, which was equal to 2s., for the 1s. 10d. they received. Some consolation for this sacrifice was then felt in the expectation that the turn of the Government would come when the railway receipts were paid into their treasuries, for then would the Government, in the same way, receive rupees worth 2s. in India and credit the companies with 1s. 10d. in England; but the Government were doomed to be unfortunate. No sooner did the railways begin to earn respectable revenues than the exchange again fell, not only to 1s. 10d., but below that rate, incurring further loss by the very operation through which the Government expected gain. The Government have, however, gained to the extent of about £500,000, through the higher rates of 1s. 11d. and 2s. having been fixed upon with some companies. Whether their losses in the end will be wholly recovered it is impossible to say, and it would certainly be unsafe to predict.

The value of the land is, of course, an essential part of the first cost of the railway and ordinarily would be a capital charge. It is not, however, included in the capital accounts of the companies, as one of the conditions of the contracts is that the land is granted free. The exclusion of the sums representing these items will not, perhaps, be considered as giving so very unfair an advantage to the railways as would appear to be the case, if it is borne in mind, when making up the accounts, that the companies are not credited with what might have been earned from mails and troops, had not the former been carried free, and the latter at reduced charges, for the Government.

Value of
land.

Unrepaid
guaranteed
interest.

The unrepaid guaranteed interest should not, I think, be regarded as capital. True, it is not interest earned, and it is a gift, *pro re natá*, to the shareholder ; but the capital of a railway, or of any work, is, I take it, the actual amount which, on its completion, has been expended on it. If railways had been made by Government with borrowed money, their capital accounts would not have been charged with the interest accruing on the loans which fell short of the receipts. And if a man builds a house, and finds that the rent gives him two instead of five per cent., he does not year by year look upon his house as having cost the amount of the difference in addition to the original outlay. With this explanation, I propose to take as the capital of the railways only what I find entered as such in the accounts.

Capital.

These show that the guaranteed lines now open have cost in round numbers £94,000,000, and the State lines about £12,000,000. This gives an average of about £15,600 a mile. But some have cost much less than others. The cheapest line hitherto has been the Rajpootana, a metre gauge line which has cost, so far, about £6000 a mile ; the most expensive, the Bombay and Baroda, which will be upwards of £20,000, although portions of this line have recently been constructed at the lowest figure yet reached, viz. £4000. The outlay on the East Indian has been about £20,000 ; on the Great Indian Peninsula, £17,800 ; and on the Madras, £12,000 per mile. The Oude and Rohilkund will have cost about £11,000 per mile, and the Sinde, Punjab, and Delhi, £16,000. The South Indian, also a metre gauge line, when finished, will probably have cost about £6500. The expenditure on the trunk lines has been much larger than was expected. Some of it could not have been foreseen ; some could not have been prevented by

any skill or forethought ; some may be ascribed to imperfect calculations ; and some to mistakes and mismanagement. A general spirit of recklessness and extravagance has been laid at the door of the guarantee system, because a certain dividend was assured to the companies ; but opinions differ on this point. A more efficient system of co-operation and control might, I think, have been established by the Government and the companies at the first, whereby costly mistakes might have been avoided and delay prevented ; but they were not errors consequent on the payments of interest to shareholders, and it is only necessary to point to the experience of railways in the rest of the world, whether in England, on the Continent, or in America (with the cost of which those of India will not compare unfavorably) to show that the absence of the guarantee did not encourage or enable shareholders to prevent waste, extravagance, and even ruin.

Amongst the sources of expense not foreseen may be included the Sonthal rebellion in 1855, and the Mutiny in 1858, both of which events produced destructive effects upon the works of the East Indian Railway, besides costly delays and alterations. The actual amount of loss incurred by these calamities has not been positively ascertained, but it has been estimated at between three and four millions sterling. Causes of expense.

Then the difficulty of transporting materials from the ports to the interior was much more serious than was expected. So great was the necessity felt for pushing on the works, that the lines were not constructed "telescopically" (by which means the rails themselves as laid down become available for the conveyance of materials), but were commenced at various places at the same time. The ordinary carrying service of the country, both by road and river, broke down, and it was thought worth while for the East Indian Railway Company alone to provide

steamers, at a cost of half a million, for taking their stores up country on their arrival at Calcutta. The river crossings were also a source of unexpected expense. They were, as I have before observed, sometimes beyond the grasp of the engineer, who had miscalculated or been misinformed on the volume and force of the floods in the monsoon, and the repairs and additional works which became necessary greatly added to their original cost. Mistakes, and worse than mistakes, have also been made in the mode of executing portions of the lines, which have failed from sheer mis-construction.

It would, of course, have been much more satisfactory if railways had cost less. We can only now make the most of the experience which we have gained, and take care that in future past errors will be avoided and suitable lines constructed at a much smaller outlay.

Before leaving the subject of capital, I should mention that the whole of the guaranteed stock has practically been raised in England. Scarcely 1 per cent. is held in India, and not half that by natives. It consists of £84,000,000 share capital, of which £82,225,000 receive 5 per cent.; £1,275,000, $4\frac{3}{4}$ per cent.; £500,000, $4\frac{1}{2}$ per cent. This is held by 56,400 shareholders, of whom 800 are in India, 390 of these being natives. In addition to this, £4,766,300 has been raised by debentures, with rates of interest varying from $4\frac{1}{2}$ to 4 per cent.; £5,786,300 by debenture stock at 4 and $4\frac{1}{2}$ per cent. There is also a sum of £562,000 not bearing interest, consisting of premiums on stock, &c. The capital for the State lines has been raised by Government loans, principally in India, at from 4 to $4\frac{1}{2}$ per cent.

One gratifying feature in the present position of railway finance is that more money is being obtained in India for the purpose of extending railway com-

Amount
of stock.

Money
obtainable
in India.

munication. Some native States have come forward, and undertaken, with the assistance and under the guarantee of the Government, to provide the necessary capital. This has been done by the Nizam, Holkar, Scindia, and the Guicowar. Provincial revenues are being also devoted to meet local wants, and natives interested in the agricultural and commerce of their neighbourhood have joined in promoting the work. A line constructed under an arrangement of this kind was laid down between Hathras, a station on the East Indian Railway, and Muttra, on the River Jumna. It is about thirty miles in length, and cost about nine lacs, six of which were provided from provincial funds and three from local subscribers. And another case has just occurred where the whole of the sum required for a railway, twelve miles in length, between Del-danagur, a station on the East Indian Railway, and Ghazeepore has been subscribed by natives in the neighbourhood.

We have now to consider the various effects which railways have produced upon the country. These may be regarded in their social and political, as well as in their commercial and financial, aspects. Effects of railways in India.

The first effect which railways had upon the lower strata of society in India was to improve the wages of the labourer, and to open his eyes to the fact that he possessed a property the value of which was regulated by natural laws, and not, as was often the case before, by the will and caprice of his employer. In the workshops, which now exist, the skilled native artisan works side by side with the Englishman, learning his ways and following his example. The moral effects of this intercourse will soon be seen in the removal of prejudices and in the alteration of habits. The railways will also improve the condition of the people by enabling them to be supplied with cheaper food and raiment, and by Social.

helping to educate them. As they go to and fro, they will see and learn much that they never thought of before. There will also be more intercourse and friction. The power of caste will likewise be shaken. Rather than pay more for his fare, a high caste Hindoo travels in the same carriage with a fellow creature whose presence in the same room would be considered pollution. At first, natives hesitated to travel for fear of the mysterious motive force which they could not understand. Their dread has been converted into admiration. The pilgrim was doubtful of the propriety of travelling by railway, but an authoritative opinion being obtained from the great Sanhedrim of Hindoos that railways might be used by devotees without impairing the efficacy of their pilgrimage, hundreds of thousands use them annually. As "trifles make the sum of human things," it may be worth while to mention that, in the early days of railways, the lower classes attempted the game, to which they are very partial, of bargaining, and tried to beat down the prices of their tickets at the booking office; I need not say that they soon learnt to discontinue this practice. The higher classes have also been taught a lesson. A petty rajah, at first, would come up to a station breathing out "threatenings and slaughter" upon the station master for allowing a train to go before his arrival. Now he finds that even a rajah in his own territory must submit to the "imperative call" of the railway bell. Thus in many indirect ways are railways producing a salutary effect upon the social condition and habits of the population at large, and aiding the approach of that social improvement and regeneration which we all hope to see. Direct advantage may be better measured by the numbers who actually use the railway. It is quite clear that the natives are not deficient in that desire to move about which is attributed to the whole human

family, and that the number travelling will be in proportion to the facilities given. Fifteen years ago the passengers numbered about $12\frac{1}{2}$ millions; ten years ago they amounted to $18\frac{1}{4}$ millions, and in 1875, they rose to $26\frac{3}{4}$ millions in the year. When it is stated that the population of the lower class passengers is generally about 97 per cent., the second class being about 2·25, and the first less than one per cent., it will be seen that it is the mass of the people who travel and support the railway. The fares must be low to attract them. On some lines, the Oude and Rohilkund and the South Indian, for example, the lowest class is about a farthing a mile, so that a passenger may travel 50 miles for the equivalent of a shilling. Nor in enumerating the social effects of railways should we omit the advantages which they bring to Europeans. They contribute enormously to their health and comfort, and are the means of saving the life of many a sufferer and invalid, who is now conveyed easily and rapidly to a port, over distances which before involved weeks of distressing fatigue and exposure. The enjoyment of a journey depends upon the same causes as prevail elsewhere. Health, weather, scenery, companions, make travelling pleasant or disagreeable, just as life in general is effected by such external influences. The heat is sometimes exceedingly trying, and no less so is the dust. The eye in some journeys becomes wearied with the arid plain, the jungle, the marsh; and a distant hill is a refreshing variety; but if your route is over the ghats, under the Neilgherry Hills, through the richly cultivated valleys of Southern India, or within sight of the Himalayas in the Punjab, you are enchanted with the beauty and magnificence of the scenery.

Regarded from a political point of view, the value of railways in India can hardly be exaggerated. It is scarcely necessary to point out that whatever, in Political.

a country of such extent, unites the various seats of Government, whatever enables the military force to be moved with ease and expedition, must be a source of strength to the Government and a means of preserving peace and security to the country. Railways do this, at a large saving of money besides, and bring home, moreover, to the native observer, whether he resides within or without our territory, the wonderful energy, power, and resources of the governing race. Nothing, perhaps, shows the effect of our rule upon India more than the railways. It is visible, tangible, and felt by all. Liberty, security, justice, irrigation, might, in some modified forms or other, have been attained without us, but if the superfluous capital of England had not been available for her railways, India would have been as China is now, with nothing but a toy line.

Commer-
cial.

On their importance as engines of commerce I need not enlarge. They have already become the chief instruments for carrying on internal trade, and have greatly contributed to its development. They have also been the means of increasing external commerce. New markets have been opened to places previously shut out from commercial communication with the rest of the world. Commodities have been supplied from sources before unknown to dealers in them. Energy has been aroused, and the desire to exchange and barter goods has been increased. The native trader is quick and calculating. I was surprised to find, in remote parts of India, how familiar he was with the prices which prevailed in distant markets. He does not fail to take into account every anna which he has to pay for the transport of commodities, but he attaches a value to greater certainty and celerity of dispatch than he has been accustomed to, as well as to the absence of waste in transit. We met with an interesting example of the union of eagerness and submissive-

ness in the native character when travelling last year in the Punjab. At a station between Lahore and Moultan, heaps of wood were waiting to be taken on, but were delayed in consequence of the inability of the flotilla to convey them down the river Indus. The poor consignors, who had remained day after day with their merchandise, were in a great state of perplexity and excitement, and were at first ready to demolish the traffic manager. They not only wished to avoid disappointing their correspondents at Kurrachee, but feared lest rain should come and spoil their goods. The traffic manager, unfortunately, could not help them, but promised to do his best, and with considerable tact checked their complaints, and pacified them, by reminding them that it was the will of Providence that the vessels could not convey more goods than they could contain, and that if the rain did come they must remember who sent it.

The amount of goods carried by the railways is in a great measure dependent on trade, and is affected by the same influences, being increased or diminished by good and bad seasons, confidence and distrust, peace and war, high and low prices, and so forth. The following figures show the increase of traffic during the last fifteen years. In 1860, the tonnage was 553,857; in 1865, it was 1,628,970; in 1870, it was 3,435,269; and in 1875, it was 4,388,649. The mileage open in these respective years was, 840, 3000, 5000, and 6500. For last year I am not able to give the sum total, but I know that a great stride was made, especially on those lines where the rates were lowered, and where an enlightened management has been pursued. This was particularly the case on the East Indian Railway, and to the course followed by that company may be attributed the chief part of their prosperity. In consequence of the low rates, combined

with other circumstances, such as the removal of the export duty, the price of silver, and the facilities afforded by the Suez Canal, large quantities of grain have found their way to this country at a price which left a good margin for profit. Wheat can now be sent down to Calcutta from Cawnpore, a distance of 684 miles, for about 6s. 4d. a quarter, and from Amritsur, in the Punjab, a distance of 1245 miles, at a cost of 12s. 9d. a quarter. During the eight months between March and December of last year, 3,864,780 cwt. of wheat were exported from India. In the same period of 1875 and 1874 the amounts were 1,835,000 and 835,518 respectively. There has also been a large increase in seeds. In 1874, the quantity of linseed exported in the above-mentioned period was 2,420,973 cwt.; in 1875, it was 3,892,206, and in 1876 it rose to 4,755,741. This is something for railways to have helped to accomplish. Who would have expected, twenty years ago, that a granary for England would be found in the valleys of the Jumna, the Ganges, and the Sultej? Or that, by the influence of steam, America and Russia would find in the far East a competitor for supplying us with food?

As another example of the effects of lowering rates, I may mention that on the reduction of the charge for the conveyance of salt on the Eastern Bengal Railway, the traffic increased from 70,524 maunds in one year to 422,976 in the next, nearly six-fold.

The goods are generally divided into five classes, the rates varying from 4d. a ton per mile for the highest to $\frac{1}{2}$ d. a ton for the lowest class, this last being exceptionally low, and only at present adopted on the East Indian Railway for grain and coal.

Financial
results.

The financial results, as a whole, have hitherto disappointed expectations. Many thought, and I include myself amongst the number, that the rail-

ways would have paid better before this. Our opinions were, it is true, founded upon estimates of a smaller capital outlay, but our hopes rested upon a more rapid increase of revenue. Besides the large original cost, the causes of this disappointment may be found principally in the slower development of traffic than was expected, and, to a certain extent, in the high charges for working and maintenance. Let us see what the deficiency is. Some of us may think that, after all, what India now pays for her railways is not very ruinous, and that she either directly or indirectly receives compensation for the burden imposed upon her. This may be true. But the absence of the burden would nevertheless be a more satisfactory state of things. The deficit falls upon a people who cannot afford to bear it. What is first desired is, that the receipts from the railways should cover the amount of interest annually due on the capital. During the last twenty-six years the State has paid to the companies a sum of about £61,500,000.* Up to the end of last year, about £34,736,000 had been earned by the railways, so that there has been an average annual deficiency of rather more than £1,000,000. In some years the actual sum has approached £1,500,000. It must be borne in mind that for a long time a large portion of the capital was unproductive. Extensive works have been going on all over the country, and of course only open lines were able to contribute to the revenue. It was not until 1871 that the system of trunk lines was completed, so that time has hardly yet been given to develop their capabilities. Time, however, is not only required to bring out the actual productiveness of the railways, but the powers and abilities of managers, and the due appreciation by customers of the value of this novel mode of conveyance. The

* See Appended Table.

total net revenue earned by the railways in 1875 was £3,647,868. The amount paid for guaranteed interest was £4,650,346. The deficiency was thus about one million. Last year's results will I expect be more satisfactory. I am in hopes that it will be found that the deficiency in 1876 will be reduced to half a million.

Again taking the results of the same five years which have before been selected for purposes of comparison, we find that in 1860 the net revenue from the railways was £276,800; in 1865 it amounted to £1,434,000; in 1870, to £2,805,188; and in 1875 to £3,576,514. In 1876 I estimate that it will be £4,200,000. The gross receipts from passengers were £1,188,000 in 1865; in 1875 they were £2,341,000. The gross receipts from goods in 1865 were £2,000,000; in 1875 they were £4,773,000.

I have been referring hitherto to the guaranteed railways in the aggregate, but this average account conveys anything but a clear or correct notion of some of the undertakings. Although it may not be in railways "to command success" while they may deserve it, results, for our present purpose, must be the test of superiority, all due allowance being made for disadvantages attendant on age and position. The East Indian Railway stands out pre-eminently as a valuable, well-conducted, and prosperous line. Its advantages are great, and the company is now making the most of them. The results of last year show that it yielded nearly 7 per cent. on a capital of £30,500,000. The gross receipts were upwards of £3,000,000; the working expenses about a third of that sum. The East Indian Railway has thus beaten all the English lines, some of which, by dint of debentures and debenture stock, guaranteed and preference stock, raised on favorable terms, have been able to

squeeze out a dividend at the same rate, or sometimes a higher rate than the above, to the holders of a third of the whole capital expended. If the capital of the East Indian Railway had been divided in the same proportion of ordinary stock, preference stock, and loans, as is the case with the average of English lines, the dividend to the shareholder would probably have been about 11 per cent., and this too, be it remembered, with average charges for conveyance, taking goods and passengers together, at one half the rate of those in England.

Next in importance and success comes the Great Indian Peninsular Railway, the expended capital of which is about £23,500,000. The gross earnings last year were £2,230,000, and the expenses will probably amount to £1,050,000. The net receipts will thus produce a dividend of 5 per cent.

The Eastern Bengal Railway, with a capital of £3,000,000, will yield about $4\frac{1}{2}$ per cent.; the Bombay, Baroda, and Central India Railway will produce $3\frac{3}{4}$ per cent. on a capital of £7,750,000; the Madras $2\frac{1}{2}$ per cent. on a capital of £10,250,000; the Scinde, Punjab, and Delhi $2\frac{1}{4}$ per cent. on a capital of £11,000,000; and the Oude and Rohilkund $2\frac{1}{2}$ per cent. on £5,500,000; the South Indian yielded $2\frac{1}{2}$ per cent. on the capital of £3,700,000; but nearly 4 per cent. on a capital of £2,560,000, which is the amount expended on the open line.

These figures are approximate, but they are sufficiently accurate to serve our present purpose. It thus appears that out of a capital of £94,750,000, expended on the guaranteed lines, the Government, during the last year, will probably have been exonerated from the payment of any interest on £54,000,000 (lines representing this sum having earned more than 5 per cent.), and that the deficiency is derived from certain lines, representing

a capital of £40,750,000, of which £3,000,000 yielded $4\frac{1}{2}$ per cent., £7,750,000, $3\frac{3}{4}$ per cent. and £30,000,000 between 2 and 3 per cent. With regard to these last, it may be observed that they are for the most part labouring under disadvantages which, in the case of the Scinde, Punjab, and Delhi, will be removed when the Indus Valley Railway brings the Punjab into connection with its natural port, Kurrachee; and in the case of the South Indian, which already shows clear signs of life and vigour, when the important link connecting Madras with the southern portion of the line is finished. It should be remembered also that the Oude and Rohilkund, also a promising line, is still in its infancy, and disconnected at its extremities with other lines of railway.

The state lines which constitute the rest of the system now open are, with the exception of the Rajputana railways, not favorable specimens; they are either unfinished or of diminutive length. The line I have just mentioned does, however, furnish a good example of a well-constructed and well-managed undertaking, and the results are already satisfactory. It starts from Delhi and Agra by two separate lines, which form a junction at Bandikui, whence it proceeds to Ajmere and the cantonment of Nasirabad. From thence it will go south to Indore and join the Great Indian Peninsula Railway at Khandwa, and south-west to Ahmedabad, where it will meet the Bombay and Baroda line. At present it is only open to Nasirabad from Delhi and Agra, with a branch to the Sambhur Salt Lakes, and it is this portion with which we have now to do. It is a single line, and has been constructed on the metre gauge. Its length is about 400 miles. It has cost £2,500,000, or about £6000 a mile; but it is estimated that another £500,000 will be required to complete and

equip it properly, bringing its total cost to £3,000,000, or about £7200 a mile. This includes a bridge over the Jumna at Agra and minor bridges. It was opened for traffic in 1875. The total earnings for the half-year ending 30th June last (the half it must be admitted when most traffic takes place) were Rs. 1,321,535; the expenses Rs. 749,248, leaving Rs. 572,260 as the net receipts, being at the rate of 2·27 per cent. for the half-year, and more than $4\frac{1}{2}$ per cent. for the year. If the value of stocks in hand be excluded from the capital account, the rate would be 5 per cent. Considering that the result has been attained in a single year, it cannot but be regarded as very satisfactory, and as furnishing good ground for hope in the future.

The revenue of all lines, whatever their cost, must depend not only on the traffic attracted to them, but on the cost of working and maintaining them. Different undertakings vary much in this respect. One from its position may naturally command a large traffic; one may be able to obtain fuel at a cheap rate; another may have easy gradients; another may be a good serviceable length, and have an equal stream of traffic each way; and another may be connected with a port where the freights from England are comparatively low. All these would possess advantages which would promote economical working; but skilful management will overcome, or at any rate diminish, most impediments, and more than counterbalance the adverse circumstances of a less favoured undertaking. As with men the better trained and more cultivated will, with only average abilities, sometimes surpass their more gifted competitors, so with railways economy of working and correct principles of management will ensure success more than natural advantages. I do

Cost of
working
and of
mainte-
nance.

not mean that natural advantages are to be despised. They should certainly be made the most of, and not used as an excuse for folded arms. On the other hand, unfavorable circumstances should be regarded as a stimulus to extra care and exertion.

There can hardly be a better specimen of a line which at present combines the twofold advantages of good position and skilful management than the East India Railway, and yet its direct competition with the river was at one time thought to be a serious drawback. It is this very competition which has helped to make it what it is. The proof of the economical arrangements which characterise it may be seen in the working expenses, which, for the half-year ending June last, were only 33 per cent. of the gross receipts. Those of the Great Indian Peninsula for the same period were 46 ; the Madras, 72·75 ; the Bombay, Baroda, and Central India Railway, 43·56 ; the Scinde, Punjab, and Delhi, 63·69 ; the Eastern Bengal and the Rajputana, 56 ; the Oude and Rohilkund, 58·28 per cent. The proportion of expenditure to receipts for the year 1875, on English and Irish lines, was 55, and on Scotch, 52 per cent.

Expenses
peculiar -
to Indian
railways.

The expenses peculiar to the Indian Railway are not, as was first expected, so much those which are produced by a tropical climate or by the ravages of insects, but are those which arise from the damage done to bridges and other works in the vicinity of rivers by the force of the floods, and those also which follow the necessary employment of European agency. Both these causes will in time become less. Our engineers will, no doubt, in the end vanquish the rivers, and by degrees natives will take a larger share in the working of the lines. It is at present requisite to send out not only engineers, managers, superintendents, and foremen, but to employ a certain number of Europeans

as accountants and engine-drivers, as well as Employés. inspectors, pointsmen, and guards. Their wages are three or four times what they earn in England, ^{European and} and ten times more than those of natives. The latter, however, are apt learners in mechanical art, and have been trained to very useful work in the locomotive shops. It will take time to qualify them for the more arduous duties of locomotive drivers, which require coolness, courage, and decision, but some have already shown themselves to be equal to such employment, and I have known a case where the European driver was drunk, and the native fireman took charge of the engine as well as of his companion. On the other hand there are examples of the pusillanimity of the native in an emergency. In an accident which occurred from a collision near a station, the native stoker threw himself off the engine and was killed, a fakir jumped from his carriage and met the same fate, and the station-master was never seen again. Educated natives fill the offices of station masters, accountants, assistants to traffic managers, clerks, and guards. But a certain proportion of European officers and servants will always be necessary. At various selected places on the lines, provision is made for the Europeans and their families, and railway towns have sprung up, with their churches, schools, institutes, baths, co-operative stores, and libraries. Cricket, fives, and billiards are played with the same energy as in this country. The children are educated, and the sons are growing up to take part in the work their fathers have been engaged in. It is wise to attend to the health and amusements of these communities, and also to rouse a spirit of interest in the work among all the *employés*, by allowing them to participate in the success of the line they are connected with. This principle is carried out on some of the lines, contributions out

of any excess profits over 6 per cent. being made to provident funds, which belong to all who subscribe a regulated proportion of their pay. The amount added by this means to the fund of the East Indian Railway last year was about £20,000. The principle is also applied, in another way, to the working of the Oude and Rohilkund Railway, where, instead of maintaining permanent staffs at the station for the purpose of loading and unloading the goods, contracts are made with the station masters on terms which give them a small profit, and consequently a personal interest in the increase of traffic.

Accidents
peculiar
to Indian
railways.

The only accidents peculiar to Indian railways are those produced by the violence of the elements. I have already mentioned how viaducts have been carried away. It has happened that, no notice having been received of the sudden destruction of a portion of a bridge, a train was plunged into the gap. On one occasion in Scinde a village on the banks of a nullah was swept away and brought down a railway bridge in its ruin. There has also been an instance of a train being blown over by a hurricane. Wild animals are sometimes the cause of accidents. An elephant has been known to charge a train, and a buffalo has been the means of throwing a train off the line. But these are of rare occurrence, and railway travelling in India is quite as safe as in this country. Poor people sometimes die in the carriages from heat and fatigue, but they are almost always cases of those who should not have attempted a journey, being worn-out creatures, who perhaps are making a last attempt to reach some favourite shrine. The "line-clear" system is applied to the working of the traffic; but as necessity arises the block system is gradually introduced.

Policy re-
commend-
ed for their
administra-
tion.

It now only remains to consider the policy which should guide the administration of these great

undertakings. As political, or strategical, works they should, of course, be made capable of rendering such service as may be required of them whenever the occasion may arise. But it is in their other capacity—as carriers of men and merchandise—that they have to be chiefly regarded when we are concerned with their remunerative powers. It appears to me that, in every sense, their commercial character should be preserved and developed, and that the broadest view should be taken of their aims and capabilities in this respect. We should look ahead and not allow present advantages to cramp our action by realising them at the expense of future resources. I believe that a policy dictated by such a view of their position, would enable the railways to confer the greatest advantages on all concerned. In the first place, whether in the hands of companies or of the Government, they should be allowed to earn the full fruits of a careful and liberal management. I know that some would limit the profits to an amount sufficient only to cover the interest on the capital, and would give the customer the benefit of any excess by lowering rates. The vicissitudes of traffic might interpose a difficulty in the way of this arrangement; but supposing it to be feasible, would it be fair to the community at large who have furnished the means of obtaining the money to deprive them of a participation in the benefits? The excess, if not appropriated to the general revenues of the country, might be applied in extending the railway system in other districts. I have just advocated a liberal policy as being the most likely to pay. By this I mean one that brings the railways down to the wants and capacities of the people, which considers carefully the peculiar circumstances of the country, encourages the growth of its agricultural produce, and stimulates fresh

industries. The policy which would strive for high returns from a contracted traffic is not the policy suited to India; if, indeed, it be suited to any country. As I believe some of the most successful commercial enterprises have been conducted so as to secure a large aggregate profit by numerous small gains, so railways should be managed as to produce large receipts from the small earnings of a multitude of transactions. The people of India are poor, and the distances are great. Fares for the low classes of passengers, and charges for the staple commodities of the country, must be very low in order to secure the traffic which may reasonably be expected. I am glad to say that a move has been made in this direction. I do not forget that, to enable it to be done, thrift and skilful management are necessary, and we have seen on the East Indian Railway how it is possible for an Indian line, by these means, to carry its freight cheaper than any English railway. Besides the usual obvious measures for attracting traffic by good accommodation, punctuality, and all reasonable conveniences, care in the selection and economy in the use of materials must be exercised, and every effort should be made to reduce the dead weight and unprofitable work, by running as few trains as possible, and filling them up to the brim; in other words, by reducing the train mileage and increasing the train loads. There is nothing so objectionable in railway returns as "a beggarly account of empty boxes." Lessons may be continually learnt by a careful study of statistics. The very word I am afraid brings to some minds the idea of mystifying doubts and suspicions, but however much a mass of ill-arranged figures may confuse and deceive, properly prepared statements furnish the most instructive information for future guidance. Rates and fares, for instance, should be regulated chiefly by the cost of transport,

and as such charges are made by the ton, and for the passenger, per mile, it is most important that the cost of conveying a passenger and a ton a mile's length should be ascertained. This has been done by Mr. Rendel, who, by an intelligent analysis of the traffic returns, has from time to time prepared tables which show not only the cost but the amount earned from each passenger and each ton of goods carried one mile. The East Indian Railway Board were thus enabled to explain, in their last report, that the average sum received for carrying a passenger one mile was $\cdot 38d.$, the average cost $\cdot 14d.$, and consequently, that the profit on each passenger was $\cdot 24d.$; that the average sum received for carrying one ton a mile was $\cdot 91d.$, the average cost $\cdot 26d.$ and the profit $\cdot 65d.$ This is turning statistics to good account, for a unit of great value is arrived at, and the secret of success is revealed. I have already given the results of this line. Mr. Crawford, the chairman of the Company, was able to point out to the shareholders that its present prosperous position had been obtained by thrift, enterprise, and liberality, and he spoke in a confident tone of the success of the policy which he recommended, and which was explained in the last report of the Board.

After alluding to the economy exercised by the staff in India, the report goes on to say :—"It was this which prompted and justified the policy of the Board in regard to reduction of rates, and it is this reduction of rates which has conduced so much to the late development of traffic. The action and re-action of these three influences—that is to say, economy of cost, low charges, and increase of traffic—upon each other, have operated, and are still operating, to produce not only financial prosperity in the line itself, considered as a property, hardly surpassed by any line in England, but, what is of

still more importance, a commercial activity in India in some of the most important products of the soil, which will have a marked effect on the welfare of that country at large.”

It is gratifying to see so high and at the same time so just a view taken of the duties and obligations of a guaranteed Indian railway company. Satisfactory as this account is, I cannot but think that, if the principles here advocated are formed into a settled policy by the administrators of our railways in India, we shall see yet more favorable results. The prosperity of these great works and the improvements of the country should go hand in hand together. Any system of management which does not promote the due development of the produce of the soil, and stimulate the various rising industries of the country, cannot be a proper one for adoption. We have already seen how, in the case of wheat and seeds last year, the agricultural riches of the country “derived from benignant skies and a prolific soil” received an impulse from low rates. Other products will be acted upon in the same way. The growers of cotton find it difficult to compete with America, but India is now spinning much of her own produce, and will soon go a step further. Along the western coast, at Bombay, Surat, and Broach, large mills are at work. When visiting one of these in company with Mr. Rendel last year, I spoke to the owner on the subject of the import duty on manufactured goods. His remark was, “Whether the duty is kept on or taken off, we intend to beat Manchester.” In Calcutta mills for working up jute—which, as an article of commerce, has only been heard of in India within the last twenty years—have been established. There is great activity in the coal-producing districts of Bengal and Central India, and supplies of coal are being taken many hundred, and even more than

a thousand, miles up country for the use of the railways. The manufacture of iron may shortly be expected. Tea has already become an important article of commerce, and now rivals that of China in quality. There is no reason why tobacco should not be more extensively cultivated and prepared for European consumption. There are probably other articles which in time, and with proper facilities for reaching a market, will appear on the list of exports. All these are encouraging features in the material prospects of India, and all are being helped by railways. For these and for other reasons which have appeared in the course of this paper, their judicious extension is greatly to be desired.

APPENDIX.

RAILWAY.	1860.					1865.				
	RECEIPTS.			Working and Maintenance Expenses.	Net Receipts	RECEIPTS.			Working and Maintenance Expenses.	Net Receipts.
	Passengers.	Goods, &c.	Total.			Passengers.	Goods, &c.	Total.		
East Indian—Main Line	£ 131,798	£ 202,584	£ 334,382	£ 165,543	£ 168,839	£ 525,669	£ 916,435	£ 1,442,104	£ 670,005	£ 772,099
Do. Jabalpur .....	...	...	Not opened	Not opened	...	...	...	Not opened.	...	...
Great Indian Peninsula	88,343	108,206	196,549	119,795	76,754	241,469	628,827	870,296	555,670	314,626
Madras.....	39,913	36,487	76,400	46,979	29,421	149,449	200,007	349,456	177,817	171,639
Bombay, Baroda, and Central India (opened on 10th February, 1860) }	...	...	6,090	4,268	1,822	154,630	41,805	196,435	123,365	73,070
Scinde, Punjab, and Delhi (including Indus steam flotillas) .....	...	...	Not opened	Not opened	...	36,330	145,371	181,701	155,636	26,065
South Indian { Amalgamated Great Southern of India and Carnatic Railway Companies..... }	Not opened	Not opened	Great Southern of India Railway ...	...	...	19,127	16,109	35,236	17,451	17,785
Eastern Bengal .....	...	...	Carnatic Railway...	...	...	...	...	Not opened.	...	...
Oude and Rohilkund .....	...	...	Not opened	Not opened	...	62,158	50,682	112,840	54,094	58,746
Totals	260,054	347,277	613,421	336,585	276,836	1,188,832	1,999,236	3,188,068	1,754,038	1,434,030

RAILWAY.	1870.					1875.				
	RECEIPTS.			Working and Maintenance Expenses.	Net Receipts.	RECEIPTS.			Working and Maintenance Expenses.	Net Receipts.
	Passengers.	Goods, &c.	Total.			Passengers.	Goods, &c.	Total.		
	£	£	£	£	£	£	£	£	£	£
East Indian.—Main Line	722,510	1,908,959	2,631,469	1,099,459	1,532,010	801,311	1,708,352	2,509,663	963,054	1,546,609
Do. Jabalpur	62,846	59,617	122,463	104,846	17,617	77,300	107,748	185,048	107,326	77,722
Great Indian Peninsula	434,276	1,225,671	1,659,947	1,032,630	627,317	478,530	1,494,554	1,973,084	932,786	1,040,298
Madras.....	187,112	306,101	493,213	259,693	233,520	226,049	363,343	589,392	414,204	175,188
Bombay, Baroda, and Central India (opened on 10th February, 1860) ...	189,578	303,520	493,098	288,526	194,572	228,348	357,106	585,454	318,543	266,911
Scinde, Punjab, and Delhi (including Indus steam flotillas)	182,589	236,938	419,527	333,125	86,402	227,275	369,619	596,964	397,443	199,621
South Indian { Amalgamated Great Southern of India and Carnatic Rail- way Companies	39,318 3,054	31,644 464	70,962 3,518	42,646 3,967	28,316 Loss 449	54,228 }	49,125	103,353	49,774	53,579
Eastern Bengal	70,553	107,539	178,092	99,187	78,905	110,298	185,520	295,818	190,081	105,737
Oude and Rohilkund	16,329	8,254	24,583	17,605	6,978	137,585	137,587	275,122	164,273	110,849
Totals.....	1,908,165	4,188,707	6,096,872	3,291,684	2,805,188	2,340,994	4,772,904	7,113,898	3,537,484	3,576,514

Statement of Cost, and of some of the Dimensions of the largest Bridges on Railways in India.

RAILWAY.	Name of Bridge.	No. of Spans.	Length of Bridge.	Depth of Foundation below Low Water.	Height from Low Water Level to under side of Girders.	Total Cost.
			Feet.	Feet.	Feet.	Rs.
East Indian	Jumna (Allahabad)	14	3,080	40	60	40,75,800
"	Soane	28	4,536	32	37.6	26,10,167
"	Jumna (Delhi)	12	2,640	7 to 39	23.5	16,60,354
Scinde, Punjab, and Delhi	Sutlej (Loodianah)	59	6,456	40 to 50	17.5	31,06,076
"	Beas	34	8,820	43 to 70	21	22,90,366
Eastern Bengal	Goraie Bridge	7	1,295	78 to 98	51	16,95,009
*Oude and Rohilkund	Ganges (Cawnpore)	25	2,750	50 to 65	31.66	19,40,000
"	Ganges (Rajghat)	33	3,040	55	24.39	9,63,580
Madras	Chitrawutty	40	2,800	12 and 30 feet deep	20	3,54,705
Great Indian Peninsula	Kistna	36	3,865	Average 15.69	†46.51	12,80,001
"	Taptee (Bhosawul)	33	2,556	" 17.30	†57.88	13,64,900
"	Toongabudra	58	4,060	Shallow on rock	37	7,55,756
Bombay, Baroda, and Central India	Taptee (Surat)	30	1,875	Average 14	†53	8,95,260
"	Nerbudda (Broach)	67	4,187	" 37	†48.5	46,93,490
Rajpootana (State)	Jumna (Agra)	16	2,272	" 70	31.66	16,54,203
Punjab Northern	Chenab	64	9,088	" 75	20	46,78,924
"	Sutlej (Bhawulpore)	16	4,224	" 100	Minimum of 30	38,75,780

* The figures of the bridges on the Oude and Rohilkund Railway are only approximate, and subject to revision.
† Height of railway above low water.

APPENDIX.

After the paper was read at the Society of Arts, a discussion ensued, which was commenced by Mr. R. W. Crawford, the Chairman of the East Indian Railway Company, and concluded by the Earl of Northbrook, late Viceroy and Governor-General of India, who was in the chair on the occasion.

Mr. Crawford is reported as having said that people who took any interest in Indian railways were very much indebted to Mr. Danvers for his clear and comprehensive paper. What these railways are capable of doing for the country was only now appearing, and the prosperity on which some of them had embarked only now commencing. A very different state of things existed now from what there had been, and this was mainly owing to the extremely accurate and exhaustive statistics which had been prepared by Mr. Rendel, and the method which the companies now had of ascertaining the exact cost of doing every item of their work. Formerly it had been thought impossible to bring grain from the upper parts of India, where large quantities were known to be stored, to Calcutta, at a profit ; but this had been done, and recently grain had been brought from Cawnpore to Calcutta, a distance of 684 miles, at a cost of 6s. 4d. per quarter ; and arrangements had also been made by which a large quantity of wheat, which was raised in the more distant parts between Delhi and Lahore, would be brought to Calcutta for 12s. 6d. per

quarter. Was there any railway in England which could afford to carry a commodity like that such a distance at such a cost, with profit to it? But for Mr. Rendel's method of ascertaining the cost of working, and what they could really afford to carry their goods for, these things could not be carried on successfully. It was this which made the difference between the English and Indian railways. Rates equal to a halfpenny per mile were unheard of in this country, and there was no limit to the amount of profit which would be opened up in time to come. It would surprise people who knew India in former days, and who were accustomed to the jog-trot way of travelling, when the cost was so enormous, and three months' time was required to bring goods from the interior to the coast, to see the change that had been effected, and the superabundance of produce which existed in some districts of India available for our own requirements. It was deeply interesting to the people of this country to know now, that even if the great granary of South Russia might possibly be jeopardised, there existed in India a vast source of supply, which could be brought to this country with profit to all. Upwards of 200,000 tons of wheat were last year exported from India, 170,000 tons of which left the port of Calcutta, and the greater part of which came here. Taking the produce as being four or five quarters to the acre, that quantity would not require more than about 200,000 acres of land to produce it, and the extent of country was enormous where grain could be grown. There was another great trade which had recently sprung up in India, for which they were indebted to the railways, and that was the growth of linseed and rapeseed. The quantity of linseed alone exported from India in 1876 represented £4,000,000, though it was not to railways alone that this was owing. One of

the principal things which gave an impetus to the trade was the measure, of which Lord Northbrook was the father, for the abolition of the export duties. The amount of the duty in the case of wheat was nearly 1s. per quarter; in the case of linseed it was more. When they remembered that represented about two per cent., and that in these times that was considered a mercantile profit, they could understand the great advantage of the abolition. Then there came the depreciation of silver; and, then, again, the enormous advantage in producing commodities which it was possible to export to England, to the extent of some six or seven millions, was at once seen. He seriously hoped Mr. Danvers' paper would not lie buried in some report, but that it might be spread abroad to enlighten the public mind upon the subject of Indian railways. It would show that Indian railways had not been the extravagant and ill-considered enterprise they were thought to be by many people. Only on Tuesday evening, in the House of Commons, they had heard on high authority that it was in consequence of the extravagance connected with Indian railways that the State railways had been introduced. He entirely differed from that statement, and he hoped an opportunity would offer when this view could be tested by those who were interested in the matter, and who could prove that, all things considered, Indian railways had been as economically constructed as any vast series of railways in Europe, or the world. It was all very well for other countries to trade upon the experience gained in England. People said Continental railways had been constructed more cheaply than those in India, but who, he would ask, had bought the experience that enabled them thus to construct them at less cost? Why, England had bought the experience and paid dearly for it too, and it was

after we had learned in the school of experience how railways were best made, that other countries were able to avoid the errors which had led to the extravagance and enormous cost which marked the construction of the railway lines. The companies had to introduce works of a character hitherto unknown in India, and had to resort to expedients wholly novel to the country. True, some mistakes had occurred, but they were of an unimportant character really, and it was this experience which enabled other people to be so wise after the event, and to make such boasts of how much better they could have done. The statement of Mr. Danvers was a very proper sequel and a very proper commentary on much which had been said in the House of Commons at the debate on Tuesday, and he (Mr. Crawford) believed if there had been any Member of the House present who was thoroughly acquainted with the matter, a vast amount of misapprehension and misunderstanding would have been prevented.

Lord Northbrook, in closing the discussion, touched upon the chief points referred to in the paper which had been read by Mr. Danvers, observing that it could not but be considered by those who were interested both in the prosperity of India, and in the success of the railways there, as highly satisfactory. Looking at the broad results of what had been done, it seemed that they had now in that country a very widely extended system of railroads, which had been completed within the last twenty-five years. While the Government of India had paid year by year out of the revenue the whole of the interest of the money expended in constructing those lines, and, as was the case in other countries, had not put the interest to the capital account, while there still remained some railways unfinished to

be made out of guarantee capital, the charge upon the revenue was in the last financial year only one million. They had heard from the author of the paper that it would be only half a million next year. That was the broad result. Now, he did not think any one who had any knowledge of India could doubt that that was one of the most profitable investments that ever was made by a great nation. He agreed with one of the speakers that, the greatest credit was due to those who encouraged that system, and had carried it through to the present time, and especially to Lord Dalhousie, the eminent Governor-General of India. He had a thorough knowledge of the railroad system in this country, and he applied his great abilities to the subject on his arrival in India with great success. Something had been said upon the question as to whether "guaranteed" railroads or railroads made by the State were the best system. He thought there was no man in England—he was going to say or out of it—who would doubt that the best system for a Government was that the railways should be made by private capital. That undoubtedly agreed with our English ideas, which ideas he himself had not changed by the experience he had gained in India. At the same time every one who knew something of the subject would understand that it would have been quite impossible to raise money for India in railways unless a guarantee had been given. Doubtless, it was obvious that in a system of guarantee one of the greatest inducements for economy in the management, viz., an uncertainty of any return on the part of those who invested their money, was absent. The shareholder knew that he would get his five per cent. whatever might be the way in which the business of the railroad was conducted. No one could deny that; but at the same time those railroads had been conducted

by men of honour and ability, and during the time of their construction, although doubtless mistakes had been made—not more, perhaps, than were to be expected under the circumstances—he did not believe that any unnecessary expenditure had been incurred. Referring to the subject of tariffs, as far as he knew, the opinion held by those in India who had gone into the question was that, not only for the development of the resources of the country, but for the profit of the railroads themselves, it was a judicious measure that was taken by the East Indian Railway Company in reducing their rates, and that it might be followed with advantage by other companies. It has been remarked that, in regard to dealing with famine in India, the extension of railways there was the most effective means of guarding against any such calamity. It had also been mentioned by Mr. Danvers that, during the time of the scarcity in Bengal in 1873-4, there were no less than 800,000 tons of food grain brought into the famine districts by means of railroads. That was perfectly accurate, and what he had simply to add was that it was only the existence of railroads in India that had made it possible for any Government, with any exertions and at the expenditure of any sums of money, to meet these calamities. They had heard of famines that had taken place in former times in which there had been great mortality, such as the one in Rajpootana, where the scenes were perfectly heartrending. It was impossible at that time in any manner to have met that calamity. The distance from the parts of India in which there were plenty, and the difficulties of transport, were so great, that he did not believe any foresight would have met that famine in Rajpootana then. On the other hand, at the present time he thoroughly believed, from what he had heard elsewhere, that the measures which the

Indian Government and the Governments of Madras and Bombay were now adopting, to meet the scarcity in these districts, would be successful. They would be successful mainly, in his opinion, because of the railroads, which now traversed almost the whole area of scarcity, and enabled the enormous quantity of food grain now produced in India to be conveyed to those parts of the country which required it. What he would say was that railways were very good things, and the extension of trade in India very desirable. They were all glad to see those things progress, but there was one matter which signified more than all, viz. the soundness of Indian finance, which the Government of India must have first and foremost in their minds. India was a poor country compared to England, although its exports are so great, and it would not stand any extraordinary taxation. In his opinion the finances of India were in a perfectly sound condition. The finances had been so sound during the past four or five years that, although the cost of the famine in Bengal amounted to some six millions sterling, the surplus of three years was sufficient to produce a sum equal to the whole of that expenditure. In his opinion, so long as the expenditure was properly controlled, and, most important of all, so long as peace was preserved, the natural expansion of the railways of the country would enable the Government not only to meet the expenditure for such calamities, but in the course of years, would be ample to provide for the steady extension of the means of communication there. Moreover, it seemed to him that something like the prospect of a fair profit would be shown in railroad-making in India, and that they would see, before very long, natives—for he thought the capital was more likely to come from India than from this country—coming forward to make some inexpensive railroads, which would become feeders

to the main lines. He thought that was an object very much to be desired, and any encouragement which could be given to the construction of such lines would be well bestowed. In conclusion, he was sure that they would all join with him in offering their most sincere thanks to Mr. Danvers for his paper, and in expressing a hope that the present successful position of some of the principal railway companies in India was only the beginning of a condition of things which would show that those undertakings would not only be useful to the country, but would really show a very large commercial profit.

After the discussion upon Mr. Danvers's paper had closed, Mr. Hyde Clarke sent the following communication to 'The Journal of the Society of Arts :'

The protracted discussion did not give me the opportunity of speaking on the paper of Mr. Danvers. It was marked by its liberal tone, but its most important feature—its bearing upon railway extension in India—did not receive due notice. As Lord Northbrook said, "India is a poor country," but assuredly the way to keep it poor is to deprive it of railway extension, the great necessary for its development. This subject requires more consideration than it could receive in one desultory debate. The first thing to which attention should be directed is the existing amount of railway accommodation in India. Taking the figures of Mr. Danvers, 25,000,000 passengers means that one in eight of the population travels once in a year on the rail-

ways, and that it would take eight years for each man, woman, and child in India to go once upon a railway. The amount of goods conveyed is possibly a carpet-bagful, or 20 lbs. per head for food, fish, salt, fuel, clothing, implements, seed, manure, building materials, and exchangeable produce, produced and distributed or received. It is absolutely certain that upwards of one hundred millions of people have never been on a railway, nor are likely to do so as matters stand. The provision made by the Government to supply their wants, and to provide each member of the population with an outfit of railways and public works, is 2s. per head. These appalling figures in some degree represent the way in which the development of India, so powerfully portrayed by Mr. Danvers, is to be dealt with. The paltry pittance provided is made dependent on the condition of the finances of India, the maintenance of which in good condition is, as Lord Northbrook says, of great value ; but this is not a condition precedent to railway development, but dependent upon it and subsequent to it. Mr. Danvers has given the key to it. One of the first effects of railways felt by the population was he says, the rise in wages. India is a poor country, but in regard to this question of transport provision it is relatively poorer, because the material has to be found on a European standard of prices, and the return has to be obtained on an Indian standard. As I have more than once pointed out, at the time railways were introduced wages were in many places a rupee a month or a penny a day, and they have since doubled, trebled, and quadrupled. Wheat, as referred to by Mr. Crawford, is 4s. per quarter in the north-west. When the same effect has been produced in India as in Europe, on the shores of Western Asia, in Egypt, of raising the price of commodities to the commercial market standard,

less the cost of transport, then India will in so far cease to be a poor country, and will be able to pay railway fares and rates and further taxes on a European scale. The effect of the rise of prices of cotton during the cotton famine is an exemplification of the wider and general effects. It is under the influence of this gradual advance that, notwithstanding the land revenue settlement in Bengal, the revenues in India have advanced, and notwithstanding the limited burden of railway guarantees, and it is by such operations that they will advance. Consequently, railway extension has to provide for increased revenues, and to make a provision for famines, as referred to by Mr. Danvers and Lord Northbrook, and it is not for railways to be dependent on famine deficiencies, and the good or ill administration of the revenue. It could not fail to strike me that no reference was made to railways in America, where population is more sparse than in India, and where grain has to be conveyed by railway enormous distances, and where parallels will be found to those low charges for freight looked upon by Mr. Crawford as exceptional, and which are so necessary for India. It was gratifying to me to find Mr. Danvers enforcing—as I have done so often, and for so many years—the importance of the statistical study of the traffic, which is so well attended to in France, and so ill attended to in this country. It is also acceptable to find the acknowledgment of the confirmation by experience of the influence on the rates for goods of expedition in conveyance, and safety from damage (see my ‘Practical and Theoretical Considerations on the Management of Railways in India,’ 1846, pp. 6, 7, 11, &c.). Turning back to those older times, it is useful to say that one reason why Indian railways have been so long in reaching a remunerative return is the neglect of the Government, as in

Turkey, in providing branch communications ; and another, the same neglect in delaying the requisite extensions. Another cause is that ingenuously intimated by my friend Mr. Crawford, that it was only four years ago that his administrators or the Government found out the right way of determining the rates. This demands none the less notice, because, although the East Indian Railway is now so far in the right way, the principles enunciated in the discussion were calculated to convey erroneous ideas. The principles on which the rates of charge for weight depend do not chiefly rest, as assumed, on Mr. Rendel's calculation of what the goods can be carried for ; such an assumption would not be admitted by any French administrator. The first thing is to ascertain what margin there is between the price in the place of production and that at the place of sale or consumption, and the nature and quantity of the goods, and then to determine whether they can be conveyed at a gross profit more or less. It is evident, with regard to a crop of grain, that it can only be moved when the market price will afford the margin for transport, and that unless it be removed at such period it cannot be moved at all. The profit must be on the bulk. It might even, for that matter, be worth while to remove a grain crop at a nominal rate to avoid the risk of its being wasted, and so decrease the wealth of the district, for the total and continual traffic depends on the greater or less prosperity of the railway district. All these questions can only be decided, as Mr. Danvers has laid down, by statistical investigation, and it is of great importance that establishments for this purpose, which cost little money, should be adequately organised. It is to be trusted that the result of the paper of Mr. Danvers, when it comes to be discussed in England and India, through the wide circulation of the

‘Journal of the Society of Arts,’ will be to place railway extension, and the provision of irrigation and public works likewise, on a proper basis, by making them independent of the experimental budgets of Indian financial administrators, and of the casual development of a country for which no adequate provision is made.

4
From the Auster
to the

ON PERSPECTIVE.

BY
CAPTAIN A. M. BRANDRETH, R.E.
Wilton Milnes

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P E R S P E C T I V E .

IN most works on Perspective the method of drawing objects is shown, but *why* they are so drawn is not explained. The difficulty of remembering the rules thus given is great, and as many amateurs are thus induced to sketch without understanding perspective, I hope this little work will be found useful. My object is not to give rules for putting a square, a cube, a cross, a church, &c., &c., &c., into perspective, but to explain the very simple principles of the art, leaving the practice to my reader, whom, for convenience, I beg leave to address direct.

Now suppose you are looking at *a view* through a window. You see *the picture* of that view as if it were drawn on the glass. Now select a certain pane or portion of the window the size of your paper or *the picture* you wish to draw: then if you move towards or away from the window, more or less of *the view* will come into your *picture*. If more, then each object seems smaller; if less, each seems larger. This distance of your eye from the window is evidently the first thing to be decided on, since, as your paper is a certain size, on it depends what you take in to your picture; in fact, what part of the view before you, you draw. Let us suppose this settled, and call it *the distance of the picture*, or as we shall have to use the term very often, *d of p*, for shortness.

Strictly speaking this *d of p*, should be the same as the breadth of your paper, as this gives about the opening your eye can fairly take in at once; and therefore you should arrange your picture in the glass by *moving yourself and glass together* forwards or backwards, keeping the *d of p* the same; but many views can only be taken from certain spots, so you often have to arrange by altering the *d of p*, and only taking into your picture part of what you see fairly. Still whatever you do take in the central line or direction of your gaze should be the centre of your picture also, and this central point you look at, is called the centre of your picture. See

Sheet I. If you were sitting at S, and MN was your window, you could make many pictures of parts of the hills, &c., opposite you, *i. e.*, you could take as your central line SB, SC, SE, or any other line, and draw as your picture a certain distance round it; but the line you chose would be the centre of your picture.

Your window also must be supposed to have no limits, *i. e.*, to extend ever so far on all sides of the portion of it you have chosen for your picture, and this window is called *the plane of the picture*, or *p of p*.

Now if you raise your eye, without turning your head sideways, till you look horizontally, as S.P., this line is called *the line of sight*, or *l of s*, and the point in which this meets the window, or *p of p*, is called the *point of sight*. This will be straight above or below the centre of the picture, but on a level with your eye, and as all measurements are taken from it, we may call it P in the view, and *p* on your picture. It will be only one point to you, as P will be straight behind *p*.

The exact position of your eye is called *the point of station*, or in future S. only.

Now imagine a flood to rise just up to your eye, its surface will be a horizontal plane, and will make a straight horizontal line across your window and view. This plane and these lines must *always* be imagined to exist as we measure from them. The plane is called *the horizontal plane*, and the lines, one to you only, the horizontal line—say *H. plane*, and *H. line* in future.

Now the only other terms to be used are *vanishing points* and *lines of measurement*, which will be explained as we get on. Please see that you understand these. They all follow, bar the flood, on sitting down and looking out of window, thus:—

No.	Explanation.	Term.	Abbreviation.
I.	You sit down with your eye	The point of station, ..	S.
II.	at a chosen distance from	The distance of the picture,	<i>d of p.</i>
III.	the window,	The plane of the picture,	<i>p of p.</i>
IV.	and look in a chosen direction,	The centre of the picture,	<i>c of p.</i>

No.	Explanation.	Term.	Abbreviation.
V.	and then raise or lower your eye till you look horizontally, ..	The line of sight, ..	<i>l of s.</i>
VI.	cutting the window in a point opposite and on a level with your eye, ..	The point of sight, ..	<i>p</i> or P.
VII.	You imagine a flood to rise to the level of your eye, its surface ..	The horizontal plane, ..	<i>H. plane.</i>
VIII.	cutting across the window and view in a straight line on a level with your eye, ..	The horizontal line, ..	<i>H. line.</i>
IX.	To be explained hereafter, ..	Vanishing points, ..	V. P.
X.	Do. do. ..	Lines of measurement, ..	<i>l of m.</i>

Now every object in nature can be represented in a picture by lines. We cannot, I may here remark, draw curved lines at once by perspective rules, we can only find in the picture the position of any number of points in them, and then draw the curved line through these points. See Sheet VIII., which will be explained hereafter.

All straight lines in the view may be divided into two classes:—

First.—Straight lines parallel to the plane of the picture.

Second.—Straight lines not parallel to the plane of the picture.

First, then, as to lines parallel to the plane of the picture. Clearly understand what this means. Imagine a wall parallel to the *p of p*, i. e., straight across you. Then any line you could draw on the face of that wall up or down, or across it, or any way would be parallel to *p of p*, not only those straight across it.

Turn to Sheet II., which represents any one sketching, as you would see him if you were standing to one side of him, and Sheet III., which is a bird's eye view of the same. Let S be his eye, or *the point of station*; MN the *plane of the picture* S *p* P, *the line of sight*; *p* and P *the point of*

sight in picture and view; S *p* the distance of the picture; and C the same distance from MN, or the *p of p* as A is. Then SC is the distance of A, *i.e.*, the distance of any object, as A, is measured this way, not by the length of SA. Now if we imagine AB to be any straight line parallel to the *p of p*, and lines SA, SB to be drawn meeting MN in *a* and *b*, then will *a* and *b* be the correct positions of A and B in your picture; and line *ab* will be the picture of AB.

Thus, in future, as points A and B, in *the view* are *a* and *b* in *the picture*, so any point represented by a large letter in the view its picture will be called the corresponding small letter. Thus the line *ab* will mean the picture of real AB, and *xy* the the picture of XY.

Now to return to last para., *ab* evidently bears the same proportion to AB, that Sa does to SA, or Sp does to SC; and *ab* is also parallel to AB. I need hardly go into the geometrical proof of this; therefore we have, as AB is *any* line parallel to the plane of the Paper this simple

Rule I.

Any real straight line parallel to the plane of the picture will be drawn in the picture parallel to itself, and bearing the same proportion to its real length that the distance of the picture does to the distance of the real line.

This makes a very simple affair of all lines parallel to the plane of the picture; and it is evident that any other line EF, which is equal and parallel to AB, and at equal distance from S, will be represented by *ef* equal and parallel to *ab*.

Let us now take the second class, lines not parallel to the *p of p*, and suppose a vast plain extends in front of your position, it is no matter whether level or not, so that it is one even surface, it may be up or down hill as much as you like, and let a friend stand in front of you touching your eye with his finger. Then let him walk away backwards on the plain in any direction, in a straight line, his finger will mark a straight line in the air, his foot-prints will be in two other straight lines, and similarly his head, or any and all points of him may be supposed to make straight lines that you wish to draw, and all these lines will be parallel to each other. Now as he gets further away, he will appear smaller and smaller, and the distances between these parallel lines will also appear smaller and smaller, till at last they and he all join together and vanish in a point. This point is *the vanishing point* of all these lines. It is evident, too, that however many lines you can imagine parallel to these will all

vanish in this same point, as your friend may be ever so big and have ever so many points about him. The question is now to find this point. But you at once see that one of the lines, *i. e.*, the one traced by his finger from your eye has been to you a point all this time. Therefore to find the *V. P.* of any parallel line or set of parallel lines, you have only to draw another parallel to it or them from your eye to meet the plane of the picture, and that point in which it does so meet the *p of p* is the *V. P.* required. Hence we have for

Rule II.

All real lines in the view which are parallel to one another, and not parallel to the plane of the picture, meet in, or must be drawn in the picture tending to, a point in which a line drawn parallel to them from the artist's eye, meets the plane of the picture.

Or put it another way, suppose there is a certain real line in the view which you wish to draw in your picture; stand your friend on the line and let him touch your eye, then keeping his arm stiff, walk along the line till he vanishes in a point. The moment his finger touches the window, or the *p of p*, as the window must be imaginary for once, to let your friend through, that is the point you want, as if he goes on till Doomsday his finger will still only make this point to you; and, therefore, if you like it better you may put the rule—

Any real line in the view not parallel to the plane of the picture, must be drawn tending to the point in which a line parallel to it from the artist's eye cuts the plane of the picture, and all other lines parallel to it must also be drawn to this same point.

This is a good simple general rule. You will see that in the same picture there may be dozens of vanishing points, as many as you can imagine friends walking in all sorts of directions, some up, some down hill, some across, some away, but each friend will have his own *V. P.* If any two are going parallel to each other, theirs will coincide and be one in fact, *i. e.*, a well drilled army on a plain all marching in one direction, say due north, all the lines made by all the soldiers would appear drawn to one point only.

It is not necessary that all *V. P.*'s should be in the limited space of your picture, as many of your friends would be out of that long before they vanished if they went a little across your line of sight, but they will always be in the plane of your picture.

I have taken the general case, and supposed your friends to walk any

way up or down hill, but in practice almost all straight lines that have to be drawn are the tops and bottoms of houses, which are all horizontal, and must be imagined traced by a friend walking on a horizontal plane. His finger would be to start with in *the horizontal plane*, and would keep in it; also if he walks straight away parallel to the line of sight his finger will trace the *l of s*, and the point *p* will be the V. P. of all the lines he makes. Hence all horizontal lines have their V. P.'s in the H. line, and all horizontal lines parallel to *l of s*, have the point of sight or *p* as their V. P.

Now to take a familiar example, if you are standing in a street of similar houses, and looking straight across it at the houses on the opposite side, nearly all the lines you see are parallel to the plane of the picture and come under Rule I. They would all be drawn parallel to the top or side of the paper, and all the doors and windows would be drawn equal, being all at the same distance from you.

Now turn a quarter circle and look straight down the street. All the upright lines are still, and are always however you look, parallel to the *p of p*, but the horizontal lines are not parallel to *p of p*, but parallel to the line of sight, hence their V. P. is *p*, the point of sight.

Thirdly, turn a little sideways so as to be looking along but not straight along the street. Upright lines are still under Rule I., but none of the horizontal are, whether in the street or in cross streets, they come under Rule II. In the case of a regular street there would be only two V. P.'s, one for lines along the street, as these are all parallel to one another, and one for those across the street, as these are also all parallel to each other.

If you only want to sketch from nature, you now should know all you can need, as you can in any case only guess at your V. P.'s, and cannot actually draw the lines from your eye, parallel to the lines you wish to find the V. P.'s of—First, mark a point for the centre of your picture, immediately above or below that, as the case may be, the point of sight *p*, then draw your H line through *p*, right across your paper, and remember that every point in your view on a level with your eye must come on that line in your picture. Let this be your starting point, and judge the heights or depths from this, comparing it with the imaginary similar line in your view on a level with your eye. Also remember that if you have a dozen buildings, each one of them will only have two V. P. for all the principal lines in it, and that they will all be in this H. line, and any buildings square to each other will have the same pair of points for both.

Thus, the first horizontal line you draw, produce it to the *H. line* of your picture, and mark the V. P. Then take care that all lines parallel to it go to the same point. Do this for each set of parallel lines. Remember Rules I. and II., and the above few applications and your drawing will look right. It is the horizontal lines being out of perspective which give the disturbed appearance so common in amateur drawings. Sloping parallel lines, such as the sides of a road up a hill, and the railings alongside of it, ought to be as carefully drawn to a V. P., but their not being drawn to their right V. P. will not show if they are all drawn to one; though, of course, it will be an incorrect representation.

But if you want to draw a real perspective picture of a building from plans and measurements, you must come on a little further in the application of Rules I. and II. Though there is nothing new to learn, there are dodges by which they are applied, and it will be easier for you to follow me a little than find them out for yourself, and also make the application of the principles to sketching easier and easier to remember.

Now here we might begin to put a cathedral into perspective, but as that would be rather a troublesome object to begin upon, let us take some simple part of a cathedral. Now as the picture would be composed of lines, the simplest part we can take is *a line*, and if by *a line* you will kindly understand that *any* line is meant, *i. e.*, that what I am now going to say about a certain line AB, will apply as well to any line you can possibly conceive a wish to draw, you will see that if you learn how to put *any line* AB, into perspective, you know the whole art. Now to draw a line we must first find the position of one end, then draw a line in the right direction and cut off the required length, or in other words find the position of the other end. To draw a correct perspective picture of any line we must either be able to measure it or have a plan of it. A plan is most convenient here, so let us have one (Sheet IV.) of two horizontal lines first. One, AB, parallel to *p of p* and the second AC, not parallel to *p of p*.

N.B.—These are representative lines of the two classes, and what applies to them will apply to *any* lines. Let AB and AC, be really each 15 feet long, and you standing at S, 20 feet away and 20 feet to right of A, wish to draw them. In the plan 1 inch represents 10 feet, and a scale is given. You are looking straight up the paper, in direction SLP, and let AB and AC be 10 feet below your eye.

The first thing to decide is *the distance of the picture*, as on this depends the size of your picture. This we fix by thinking what size we should wish AB to be drawn. Let us decide AB, shall be drawn equal $1\frac{1}{2}$ inches, then we must make the *d of p* 2 inches, since if *ab* or $1\frac{1}{2}$ inches is to be the correct representation of AB, or 15 feet, we know by Rule I. that *d of p* is to the real distance of AB, or SL or 20 feet, as *ab*, the pictured size of the object, or $1\frac{1}{2}$ inches, is to the real size, or 15 feet. Now $1\frac{1}{2}$ inches is $\frac{1}{120}$ of 15 feet, therefore the *d of p* must be $\frac{1}{120}$ of 20 feet, or 2 inches. This of course is a very small *d of p*, but I have made it so on purpose to suit the size of my page, and one distance is as good as another in a general example. You see how the size of your object depends on the *d of p*. If you had decided to make *ab* only $\frac{1}{2}$ an inch in the picture, or $\frac{1}{3}$ the size we have decided on, the *d of p* would have been 6 inches, or three times what it is now. Now take Sheet V., which is your picture, and as this should now be a blank sheet, if you find any difficulty in following, take a blank sheet and draw the lines one by one. First draw *the H. line*, *qr*, and mark *p* in its centre, which is the point of sight. Draw a line up the centre of paper and take *ps* equal 2 inches. Then *s* will, as you will presently see, represent your *point of station*. Now we want to find *a*, the correct position of A. On your plan draw EF, *i. e.*, prolong AB both ways and let it meet SP in L. Now AL is a line parallel to *p of p*, and distant 20 feet from S, its representation *al* will therefore be drawn parallel to AL, and $\frac{1}{120}$ of AL, or 2 inches in length. Therefore *a* will be 2 inches to the left of *sp*. But A is also 10 feet below the horizontal plane, and as this measurement is also parallel to *p of p*, and also 20 feet distant, it will be drawn upright on the paper, and $\frac{1}{120}$ of 10 feet or 1 inch. Thus the position of *a* will be 2 inches to left of *sp*, and 1 inch below *qr*. This then is the correct position of A. Just in the same way could the correct position in the picture of any other known point be found. Now having *a*, and seeing that EAL is a line parallel to *p of p* passing through A, we can draw its representation *ealf*, parallel to it through *a*, and as AB is 15 feet, its representation *ab* will be $1\frac{1}{2}$ inches; so take *ab* equal $1\frac{1}{2}$ inch and you have the picture of AB. In the same way exactly had AB been upright or

sloping so long as it was still under Rule I., *i. e.*, parallel to *p of p* would it have been put in exactly the same way.

Now let us take AC, the representative line of the second class, *i. e.*, lines not parallel to *p of p*. Find *a* as before. Next we must find the vanishing point of AC, or the point to which the line from *a* to represent AC, must be drawn. We have only to draw a line from S parallel to the line AC, and the point in which this meets the *p of p* is the V. P. required. How to do this is the question. Crease your picture along the line *qr*, and lay the bottom portion flat on the table, the upper portion standing upright. Then as *s* is 2 inches from the upright paper, it is really the correct position of your eye, and the upright paper the same of the *p of p*, and the lower part of the paper, which is flat on the table, is part of *the horizontal plane*; and as AB, is a horizontal line, what is easier than to draw a line from *s* parallel to it, *i. e.*, making the same angle with *sp* that AB. does with SP, meeting *the p of p* in the *H. line qr* at *v*. Then by Rule II., *v*. is the V. P. of AC. Now you will see, if you flatten out your paper, that nothing is altered, and you need not have creased it, and that to find the V. P. of any horizontal line you have only in your picture to draw a line parallel to it from *s* to meet the line *qr*, which point of meeting will be the V. P. required. Thus *w* is the V. P. of the line GH.

Now we know in what direction to draw the picture of AL from *a*, viz., to *v*: so draw *av*, it now only remains to cut off a certain portion of *av* to correctly represent AC.

You may do this in many ways. If you know the distance C is to left of S. P., you can find this distance as you did AL, but the ordinary plan is to imagine some real line also passing through C, and draw that in your picture, and the point in which that cuts *av* must be the point C. You may take LC, if you like; you have the point *l* the correct position of L, draw *sx* parallel to LC, then *x* is the V. P. of LC; draw *lx* and the point in which this meets *av* must be *c*, but the usual and most convenient plan is to draw the line CD parallel to SP in the plan. Then we know its V. P. is *p*, so we have not to find this, and this avoids drawing more lines, which are confusing.

We have to find the position of D, but we know that *all distances on the line EF are shown by Rule I. $\frac{1}{120}$ of their real size*, hence as AD is 10 feet, it will be one inch in the drawing, take *ad* equal 1 inch, and draw *dp*. This will also cut *av* in *c* you will find.

This fact that all distances on EF are $\frac{1}{120}$ of their real size makes it convenient to measure on, and hence it is called *a line of measurement*. You may evidently have as many as you like, you have only to find the proportion of the real size that objects on any line will be by Rule I. For, example, suppose you determined to have a line of measurement through H. H is 12 feet to right of SP, 28 feet distant, and 10 feet below the *H. plane*, hence all measurements at the distance of H will be to their real size, as 2 inches the *d of p*, is to 28 feet the distance of the object, or $\frac{2}{28 \times 12}$ or $\frac{1}{168}$ part of their real size. Then find the position of H, or *h*, it will be $\frac{1}{168}$ of 12 feet to left of S. P. and $\frac{1}{168}$ of 10 feet below *qr*. Through this draw a line of measurement and every thing on this line, *i. e.*, at this distance from you, will be $\frac{1}{168}$ of its real size, and so you can make as many as you find convenient.

This is very nearly the whole affair. You now know how to put any possible straight horizontal line into perspective. We will try curved and not horizontal ones presently, but let us have a little more practice first.

Suppose GH, in your plan, Sheet IV., another horizontal line in your view, also 10 feet below your eye, in fact on the same plane as AB, and AC. They might be all the bottom lines of buildings for instance. Now, as you have established the proportion of measurement $\frac{1}{120}$ for line EF, it is not generally worth while to draw another line of measurement through H, but easier to carry on GH straight to meet EF in K. Then take $\frac{1}{120}$ of real LK. This gives you the correct position of K. Draw *sw* parallel to KG, then *w* is the V. P of KG, draw *kw*. Then draw HN, GM, parallel to SP find *m* and *n*, *lm* and *ln* are $\frac{1}{120}$ of LM and LN, and draw *mp*, *np*, which will evidently cut *kw* in *g* and *h*; the correct positions of G and H, and *gh* is the correct picture of GH.

If GH had not been on the same level as AB and EF, then the line GH produced would not have met EF in K, but passed above or below it. For instance, if GH was the bottom of a wall and G, H, the top, and we only had G, H, to start with, we could, but should not, find a new *line of measurement*, but should refer G, H, to same line EF by

imagining GH immediately under $G_1 H_1$ on the same level as EF. We should put that in the drawing just as before, and find k . Then run upright lines from kh , and g , and on the one at k take kk_1 equal $\frac{1}{120}$ the height of the wall. The top of wall would also vanish to w . So draw kw , cutting off hh_1 and gg_1 . This gives us $g_1 h_1$, the correct picture of top of wall, and $gg_1 h_1 h$ is the wall, and $g_1 k_1 kg$ is the same wall built on a bit further for our convenience. Thus you see by one *line of measurement* you can get all you want.

You will see in this case that the measurements on the plan EF, are actually the same as those in the picture at *ef*, i. e., ab is equal to AB, ad to AD, and so on. This is a little dodge, and should always be so arranged. Thus having decided that a certain prominent line parallel to the *p* of *p*, and as near to you as can be, shall be a certain size in your picture, and from this fixed the *d* of *p*, it is most convenient to *then* draw your plan, so that this line shall be that particular size in the plan. Thus, when we decided that AB, a real line in the view and really 15 feet long, should be $1\frac{1}{2}$ inches in our *picture*. I made the *plan* so that AB was $1\frac{1}{2}$ inches, and thereby simplified matters much; and this should always be done when the plan has to be drawn; but if the plan is drawn ready, and no convenient line can be found in it of the same size as it is required in the picture, say suppose we find that AB is three times as large as we require, take EO equal $\frac{1}{3}$ LE, at right angles to LE. Join OL, and draw a number of fine lines between LE and LO parallel to EO. Then as EO is $\frac{1}{3}$ LO, AQ is $\frac{1}{3}$ of LA and so on, you at once get the $\frac{1}{3}$ of any distance from L by measuring the line below the other end of the distance. I have not drawn all these lines to save confusion. If AB is too small, take EO so much larger than LO as you wish ab than AB and the same process answers. This is merely an easy way of reducing or increasing your scale; always measure from L to the point you want, and it is very simple. We have been rather long over these lines, but by repeating the operations you can do anything. Turn to Sheet VI. and VII. Here I have taken the same lines AC and GH, and supposed the one to be the ground line of one side of a church, and the other of a side of a pyramid. We get rid of a confusion of lines drawn to get them in, and you can commence with only *qr*, *sp*, *ef*, *ac* and *gh*, on a fresh sheet, and we can use the letters over again, only do not confuse

them with those in the other sheet, which we have put away. Let us have the pyramid first. Find the V. P., of HK and draw a line from h to it. Then you would naturally do the same for GK, but as the V. P. won't come in the paper, draw KR and put that in your picture. This gives you k ; join GK and you have the bottom of the pyramid. Now to find the top. Find O, the centre of the base, by drawing TO, LO, or any lines you like passing through it, set up a line at o , and let us say the pyramid is 20 feet high, you must measure this at EF, take $tt' = 2$ inches and draw $t'p$, this will cut off oo_1 the correct height; or take 2 inches at l , as ll' and draw lw to the V. P. of LO. This will also cut off the same height oo_1 of the line from o . Instead of LO, TO to find O, you might have taken lines from the corners of the base K and H to the middle points of the opposite sides, but you would have had to find those points by other lines, as they would not be the middle of gh and gk in the picture; as, of course, the further half of any line looks smaller than the nearer, and so it was easier to take two independent lines. This is the whole art, to apply Rules I. and II. in the easiest way. I do not think I need multiply examples. If I have carried your understanding thus far you can do all the rest; and if I have failed, it is no use doing more examples without the understanding. Try the church, the horizontal dimensions are as in plan, and the heights are given on the plan. I have numbered the lines as you had best put them in. You must take a little larger sheet of paper, as the V. P. of the ends of the church is beyond my sheet.

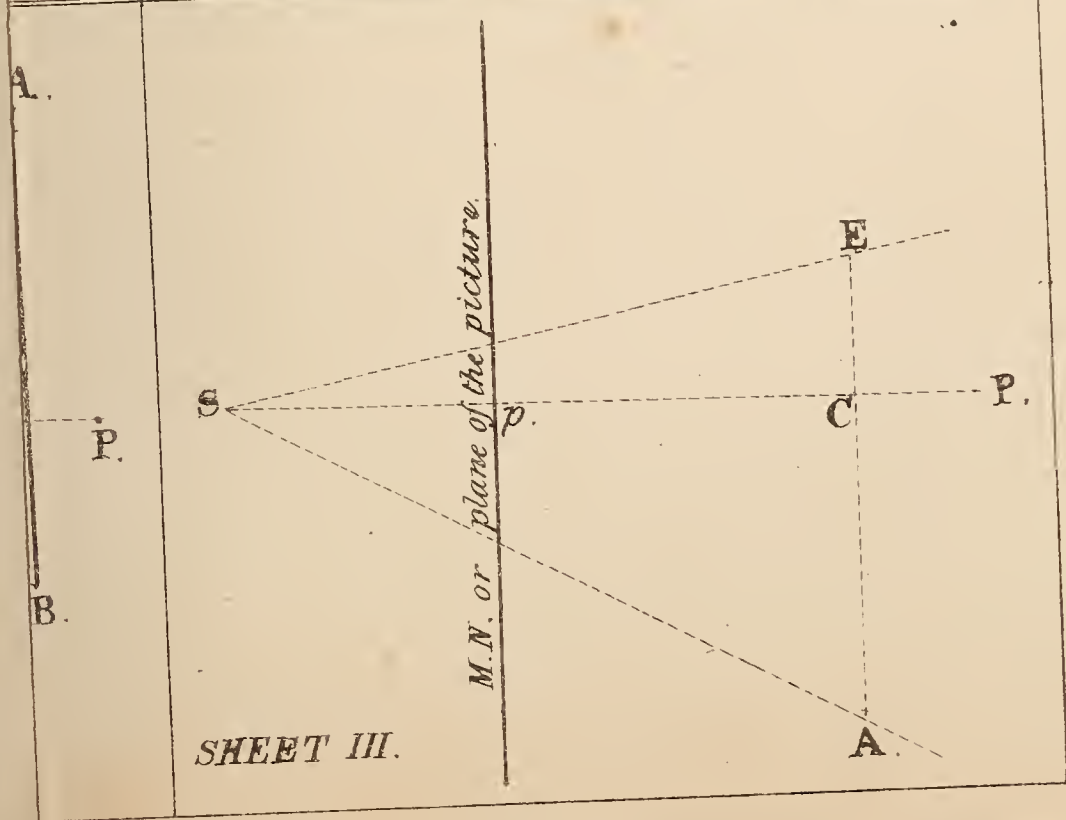
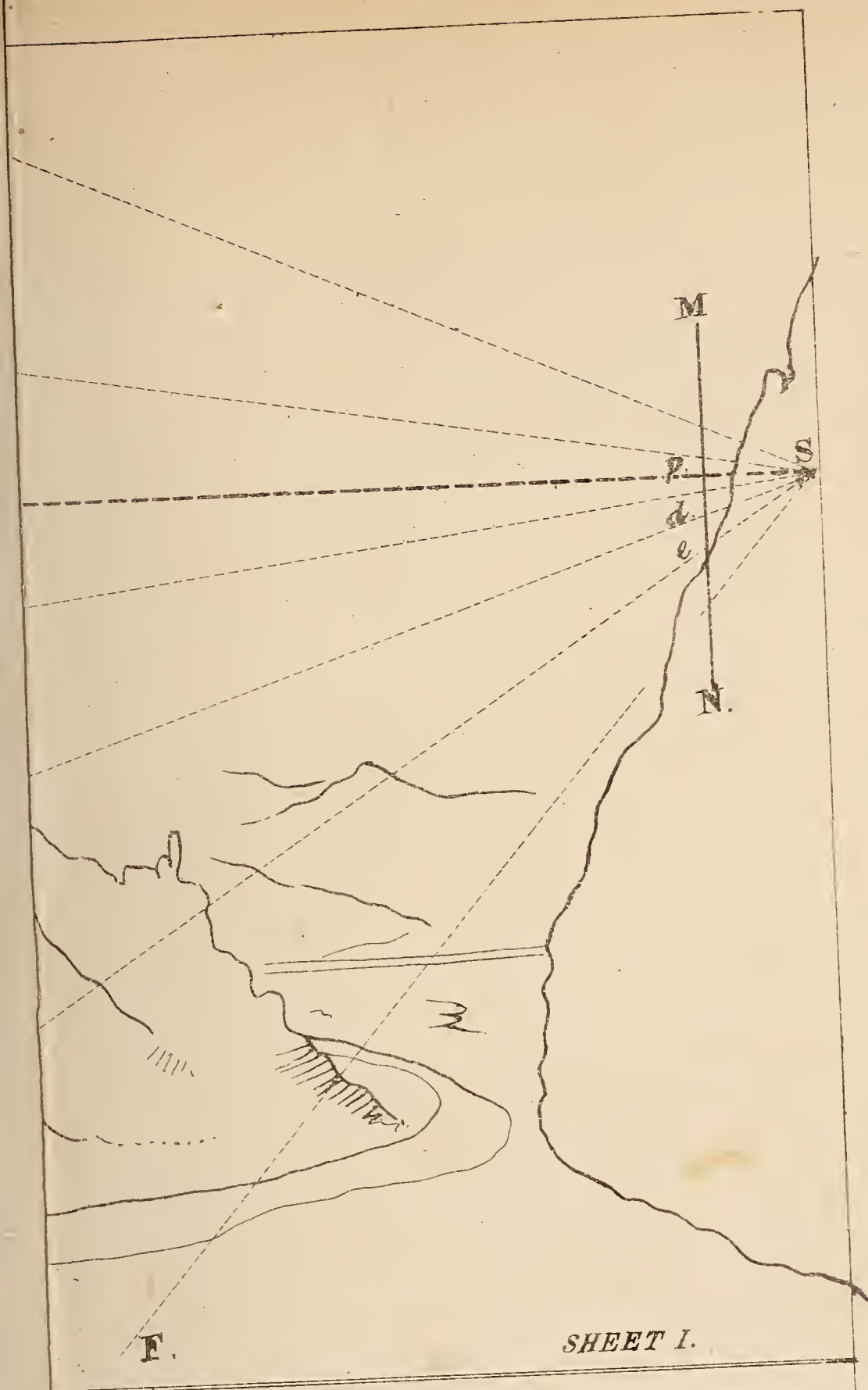
Now let us try a curved line. Turn to Sheet VIII., which is a plan of a circle. Lines SP and EF being as before. Now all you can do is to mark a number of points in the curved line and put them all in their correct positions in your picture, and draw your curve by hand through them. Of course the more points you have, the nearer they will be, and the more correct your curve will be represented. You can find each point separately as you found the first a , if you like, but this would be tedious, and it is easier to draw lines on the plan intersecting at the points and draw them in your picture. Try and arrange them so as to have as few vanishing points as you can, *i. e.*, make as many of the lines parallel to each other as you can. The whole thing consists in application of Rules I. and II., and the applications must be various. The line up from point 10 is an example. Its junction with the line of measurement is out

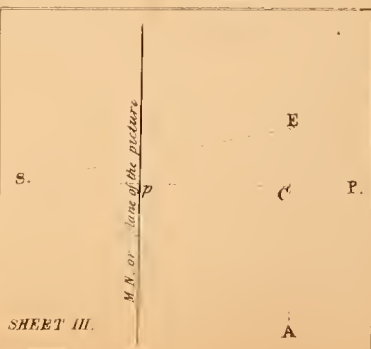
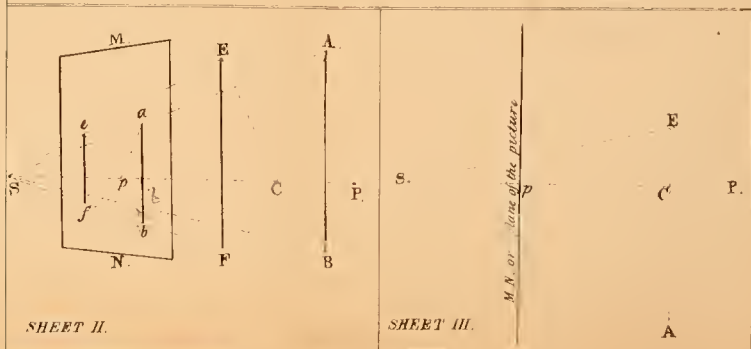
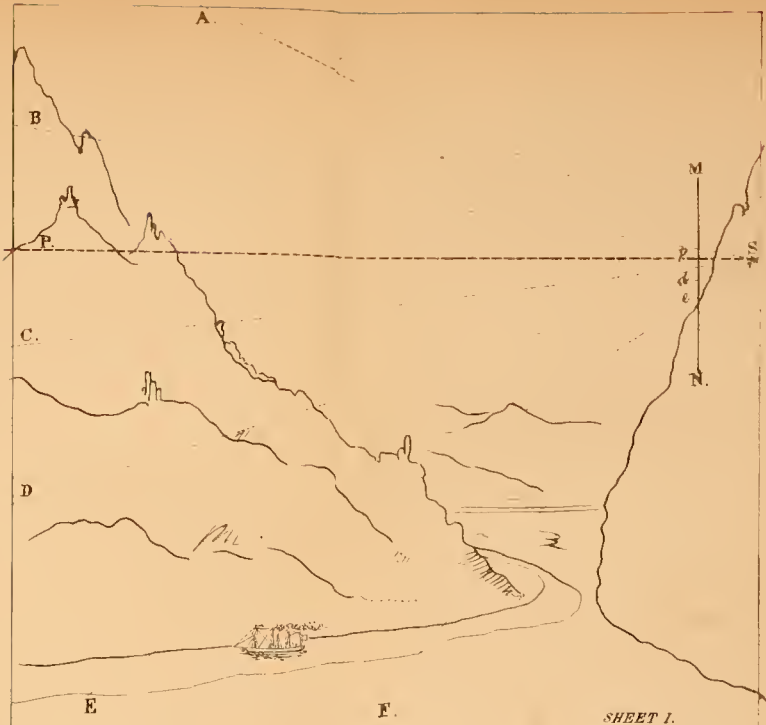
of bounds, so I get it by cutting off the point in which AG meets it, as point II., comes within the paper. Any other curve or crooked line is drawn in the same way, the point is to do it with as few lines as possible.

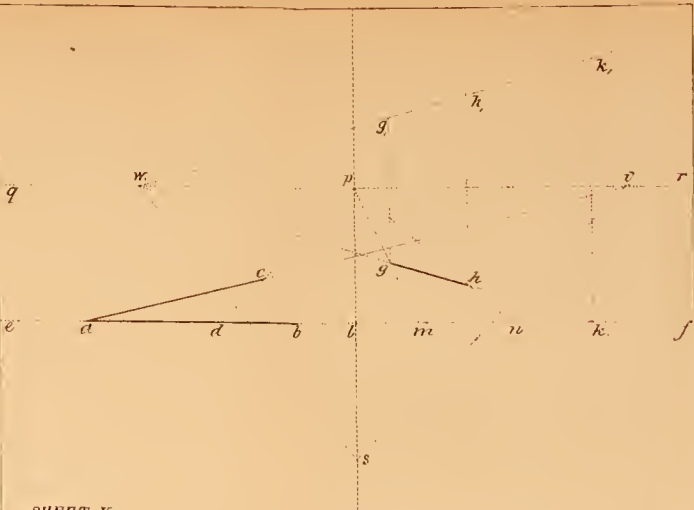
Thus far we have treated of horizontal lines only, as it is seldom that others come into prespective drawings; but with lines that are not horizontal the Rules still hold good. Rule I. needs no explanation, it stands as before. Rule II. needs no alteration, only a little explanation of its application to this case. Turn to Sheet X., and let AB, be the edge of the top of a box partly open, a rough picture of it not a plan, as I am not going to draw this, only just show how it would be drawn if there were plan measurements. This will represent any straight line not parallel to the *p of p* and not horizontal. First, put in your picture *ac* the correct representation of AC, the horizontal edge of the box immediately under AB. This you could imagine, and do, if AB was not a box and had no real line under it. Then crease your paper again along *qr* and draw *sv* parallel to AC. Now imagine a line from *s* immediately over *sv*, but sloping upwards so as to be parallel to AB. The point in which this meets the upright part of your paper, or the *p of p*, is the *V. P.* of AB by Rule II. Let *w* be this point. What we want to find is how much it is above *v*. We have an upright triangle *svw* of which the angle *v* is a right angle, and the angle *s* is equal to BAC, and we know the length *sv*. Then we can make this triangle anywhere as *svx*, and *vx* must be equal to *vw*. Do so then, and mark off *vw* equal to *vx* above *v*. Then *w* is the point you want, *i. e.*, the *V. P.* of AB, and you can draw *aw* which is the correct direction of the picture of AB. To find the position of B in this line, you have only to draw the line DB correctly. Find the point *d*, and draw an upright line to meet *aw* and you have *ab*. Now you can do this for any line of this kind, and there is no more to be learned, only to remember that practice makes perfect.

In sketching from nature, as I said before, you cannot measure in this exact way, but you should always begin by putting *qr* and *sp* on your paper, and in your view by fixing a few points they run through, and drawing objects in your picture with reference to these lines. Think in every building how many parallel lines there are, and see that all parallel lines are drawn to one point in the line *qr*, and remember *that each one not so drawn will certainly catch the eye unpleasantly*.

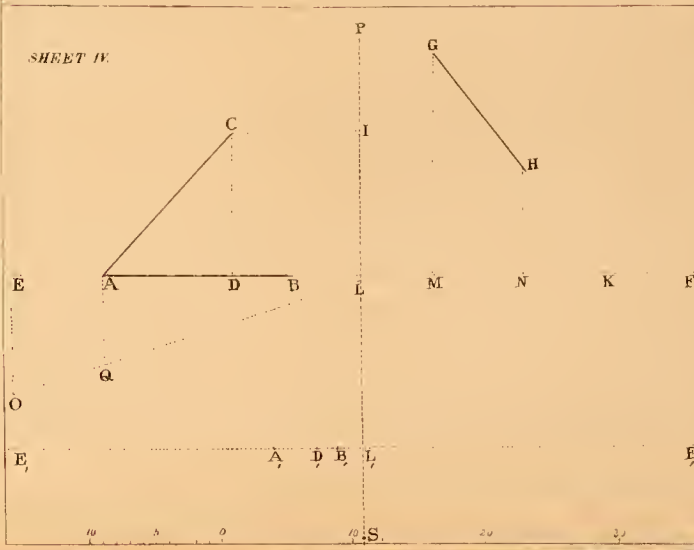
A. M. B.



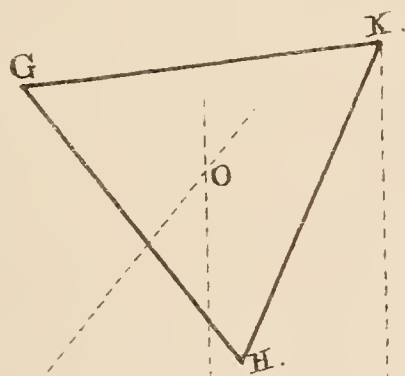




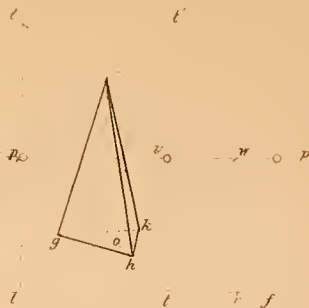
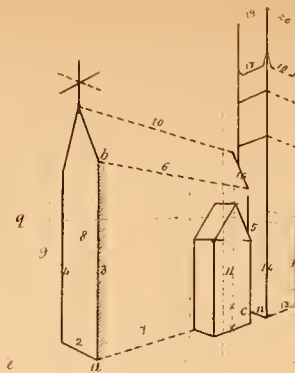
SHEET V.



SHEET IV.

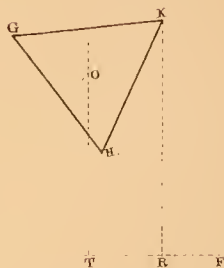
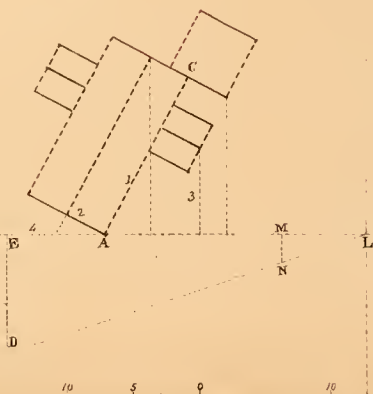


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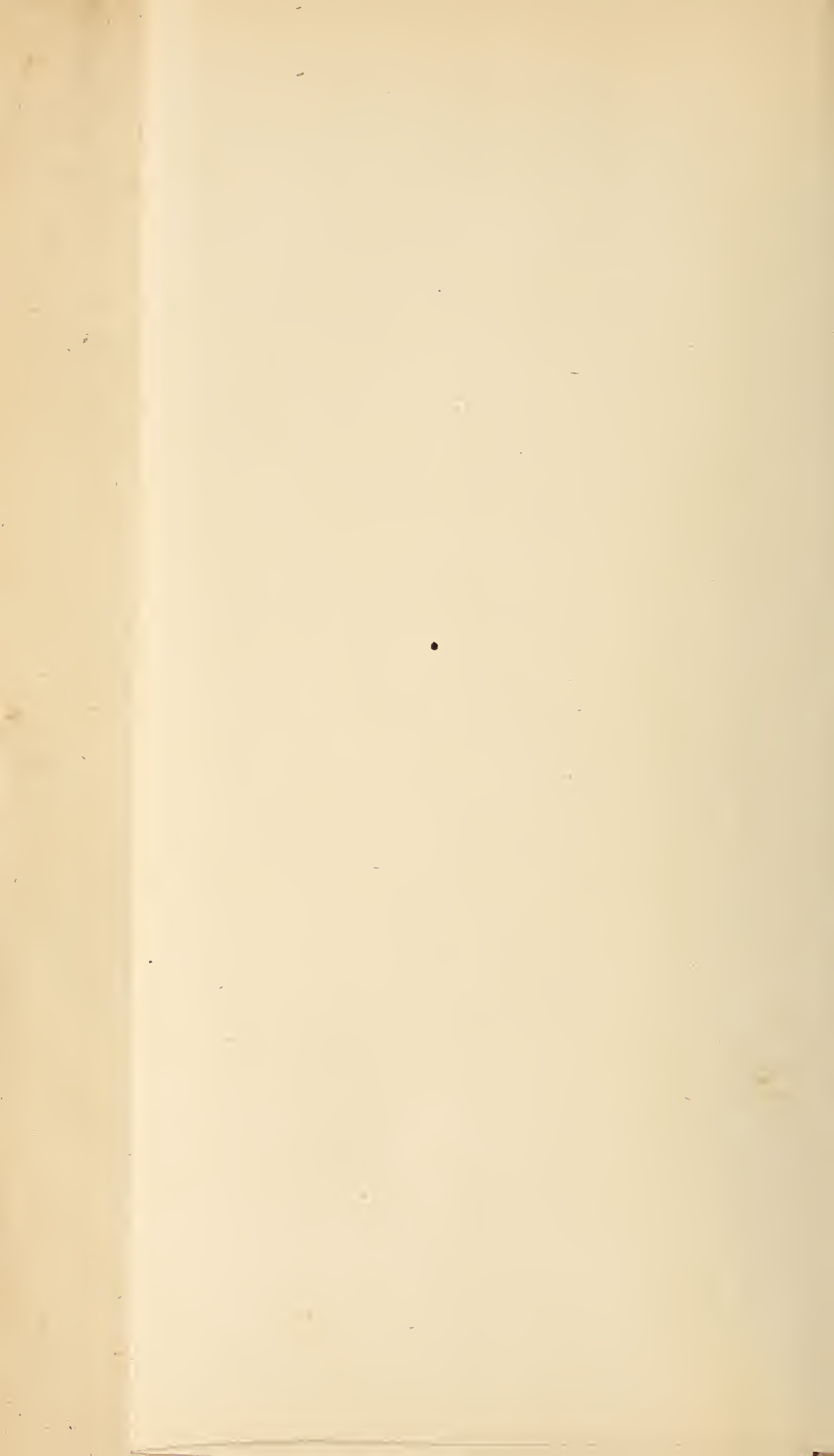


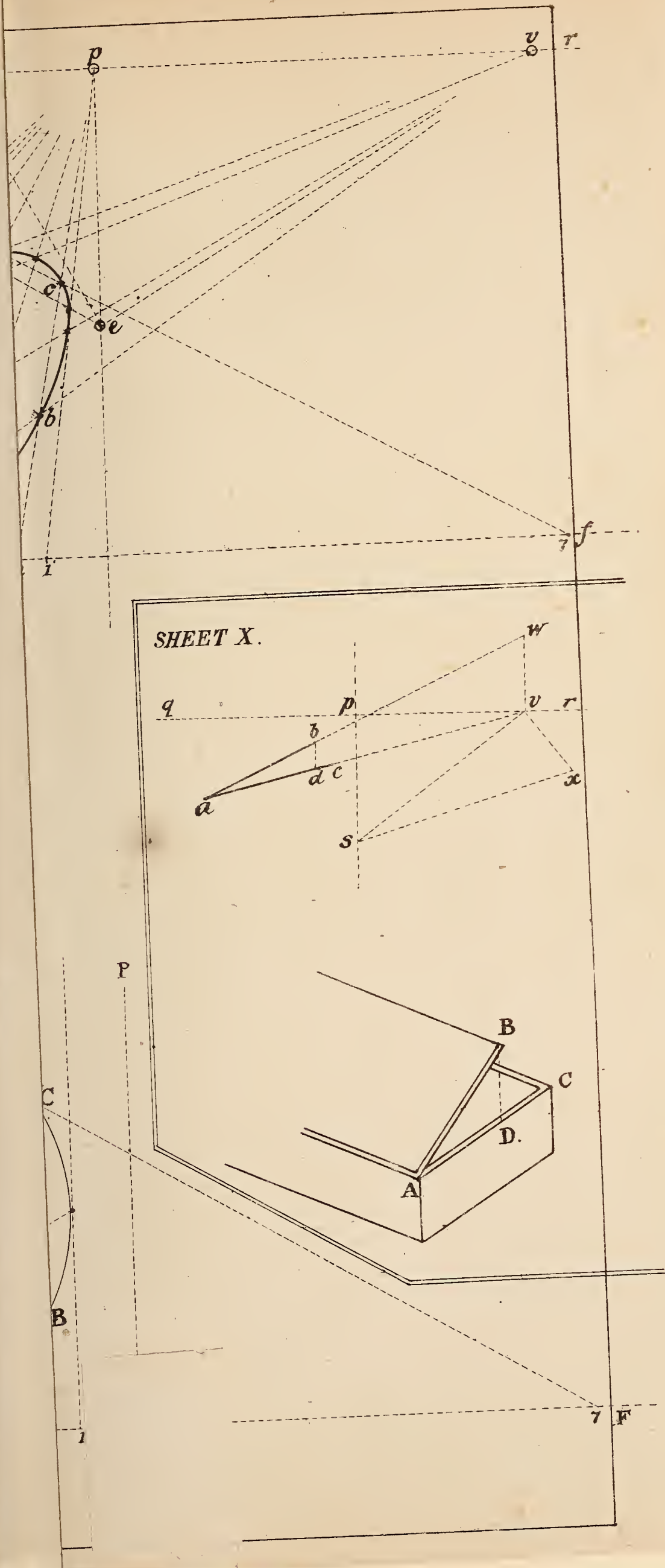
SHEET VII.

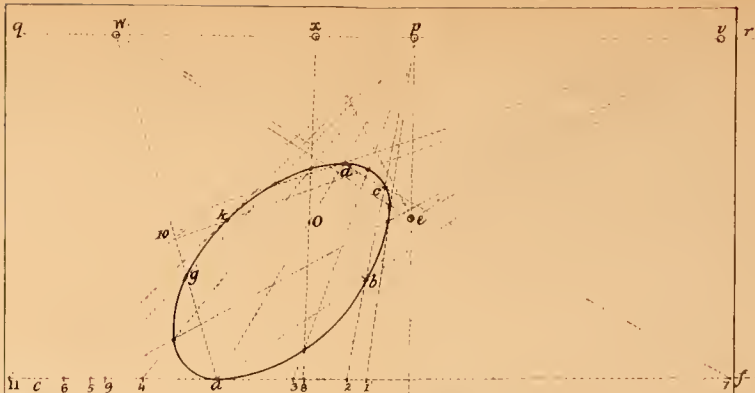
SHEET VI.



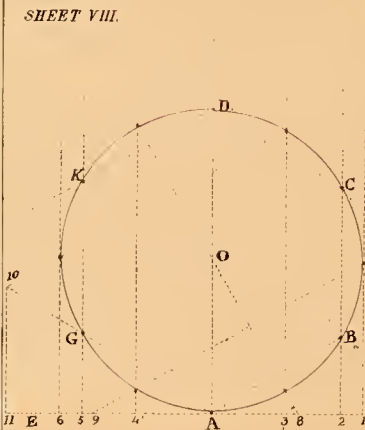
Body of Church to eave, 15.
 " " " to ridge, 20
 Tower to square part, 25
 " " " pinnacle top, 30
 Porch to eave, 9
 " " ridge, 13.



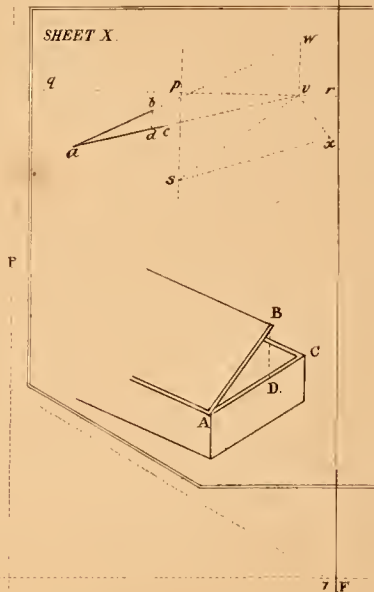




SHEET IX.



SHEET VIII.



SHEET X.

5
See
Name the Author

SKETCH
OF
THE GEOLOGY OF THE PUNJAB
AND ITS DEPENDENCIES,

BY
H. B. MEDLICOTT, M.A., F.G.S., 1829-1905

OFFICIATING SUPERINTENDENT, GEOLOGICAL SURVEY OF INDIA.

THE Punjab and its dependencies offer a wider field for the geologist than all the rest of India taken together. We can here span the whole Tibetan mountain-mass from Jamú, at the south base of the Himalayas, to the Sánju Pass of the Kuenlún, overlooking the plains of Khoten.

This traverse lies altogether in the Kashmir territories; but in Lahoul and Spiti there is within British territory a very full exhibition of the immediately Trans-Himalayan geology. Elsewhere the Chinese frontier and that of our equally exclusive ally of Nepál confine us to below the southern ridges of the snowy mountains constituting the Himalayan Range, or even to the plains of Hindustan. Entirely within the Punjab there is, moreover, a small mountain-chain known as the Salt Range, including within its narrow compass a surprisingly full sequence of the well-known formations of our geological text-

books, from silurian to pliocene, few of which have as yet been identified in the peninsula. These two regions naturally absorb a very large share of the interest in the geology of the province. The remaining area, though comprising the largest extent, and politically and industrially the most important, is comparatively devoid of attraction.

In such an outline sketch as can be given here, there would be no room for a historical notice of the several observers, or for criticisms of the views they have put forward. An attempt will be made to represent the present state of our knowledge, only mentioning that the description of the Salt Range and North-West is contributed by Mr. A. B. Wynne, of the Geological Survey of India, and that our knowledge of the Himalayan region is mainly derived from the researches of Dr. Stoliczka, who has so lately (June 1874) lost his life in the prosecution of those researches. For the rest, information is drawn principally from the publications of the Geological Survey and of the Asiatic Society of Bengal. Omission is also made of economic products; as these will receive the full notice due to their importance in the local descriptions by the district officers, who must have much more information on the subject than could be brought together by passing observers.

The description may conveniently be taken up under the following headings :—

- I.—THE PLAINS : RECENT AND POST-TERTIARY DEPOSITS.
- II.—THE TERTIARY SERIES.
- III.—THE HIMALAYAN REGION.
- IV.—THE SALT RANGE.
- V.—THE SULIMÁN RANGE.
- VI.—THE ARÁVÁLI REGION.

A brief outline of the superficial features will best introduce the order of geological description. The

Punjab proper, the land of the five waters (Satiej, Beás, Rávi, Chenáb, Jhílam), forms the centre of the British province of that name, which has an extension to the south-west down the valley of the Indus to below Mittankot, and to south-east along the right bank of the Jamna to below Delhi. The re-entering south boundary of the province between these points is formed towards the west by the state of Bháwalpur along the left bank of the Satiej, and towards the east by different states of Rájputána. This is purely a political boundary, the ground-features being continuous on both sides. From this base northwards the province occupies a roughly triangular area, bounded on the west by the Sulimán chain, having a north and south trend, and on the north-east by the Himalaya, having a north-west trend. These two mountain-systems do not, however, form a simple junction with the plains occupying the angle between them. This angle is deeply truncated, and the plains are bounded on the north by a scarped ridge well known as the Salt Range, having a general east and west trend. On the north this ridge slopes into the raised plateau of Ráwalpindi, locally called the Potwár, which is separated from the plain of Attak and the Pesháwar Valley by broken ridges having a general parallelism with the Salt Range. All these ranges of the Northern Punjab may perhaps be affiliated to the Hindu Kôh system of dislocation. The Sufed Kôh, south of the Kábal river, is the dominant feature of that system in this region; and the Salt Range may be considered the most south-easterly representative of the same. These groupings are based upon the single element of direction; and they serve at least the purpose of superficial description. So far as at present understood, only slight differences can be suggested as to the ages of these so-called systems, as will be seen from the sketch of the tertiary rocks common to both areas.

Although the Jamna forms the south-east boundary for over one hundred miles, the entire drainage of the province may be said to belong to the Indus basin. The minor mountain streams within a few miles to west of the Jamna flow away to the south-west; and the local drainage on the plains close along the right bank of the river also takes that direction. The first contribution from the Aráváli watershed falls into the Jamna just above Delhi; but except in seasons of unusual flood it does little more than replenish the Najafgarh swamps close to that city. On the north-west frontier several large streams, of which the Kábal river is the principal, flow from the Afghán Hills. With these exceptions all the water-channels of the Punjab are replenished either by local rainfall or from Himalayan sources. The Indus makes its way southwards, from its Trans-Himalayan channel, through the tangle of ranges at the confluence of the two main mountain systems. The Satlej, having its head-waters close to those of the Indus, follows a much shorter course to the plains, in a deep tortuous gorge through the Himalayan chain. The four other large rivers of the Punjab rise directly in that chain. The function of these great torrents within the mountains has been almost exclusively as agents of denudation, the history of which would soon take us out of our depth in geological speculation. We shall be fortunate if we can arrive at an approximately correct statement of their present and recent relations to the formations of the plains. This consideration leads us at once to geology proper.

I.—THE PLAINS: RECENT AND POST-TERTIARY DEPOSITS.

Blown sand occupies no inconsiderable place in the rock-formations of the Punjab. The province has a "Little Desert" of its own, in the Sind-Ságar Doáb; and large tracts elsewhere are in a similar condition. There is no sea here to keep up the supply for these wind-deposits; but other sources are not wanting, in the ever-renewed sand-banks of the subsided rivers, in the boundless barren hill-region to westwards, where the "sand-blast" must operate extensively as a denuding agent, supplying dust to be swept on by the wind and deposited elsewhere. The geological influence of the wind as a rock-producer has been very little studied, or taken into account, but the importance of it cannot be doubted. We may recommend it as an interesting line of research to residents in the Punjab.

Since the recognition, in quite recent years, of the important effects of rain, as distinct from rivers, as an agent for the transport and accumulation of earth particles, a much wider meaning must be given to the word *alluvium*, to designate all recent water-deposits not in a water-basin, its former denotation being now specified as "river-alluvium." The actual demarkation of such deposits becomes in the same degree difficult, or indeed impracticable. With the help of vegetation, rain can accumulate soil on very steep slopes; yet the flattest slope must in some degree be affected by its wash.

Starting with the usually accepted opinion that the plains of Upper India are principally formed of the materials brought down and distributed by the great Himalayan rivers, it would seem that for some time past these have not only suspended operations as land-producers on a large scale, but even that they have cut through and removed a considerable mass of

their late deposits. The characteristic and necessary feature of a river where it is in a constructive phase of activity is, that its channel should be unstable with reference to the plains through which it flows. On the other hand, the necessary tendency of a river wherever it removes more than it brings with it is, more and more to fix and confine the position of its channel. These are not optional considerations, as some writers on alluvial deposits would seem to think, but the necessary conditions of the problem. Now the river-plains of these great streams—the areas subject to inundation from them, and throughout which their channels may shift their course—seem to be, in at least some cases, permanently reduced to long flat valleys (“khádirs”), the flood-water level being considerably lower than the surface of the adjoining upland (“bhángar”). Within those valleys the rivers oscillate, eroding here and inundating there, with, in the latter case, the local formation of river-alluvium (“khádir mati”). Whether at present this action within these narrow river-plains is, on the whole, constructive or destructive has not been determined; but it is evident that these valleys would have to be silted up to, and beyond, the general level of the “doabs” before the rivers could wander into new channels, to distribute their burden of silt over fresh ground.

The whole plain of the Punjab is under one or other of these two phases; but the normal features of both states are so interfered with by other agencies, such as the action of wind and of human constructions, that it is often difficult to decide locally which is in operation. For a large area of the province and for its principal river it has been proved from historical records that the deltaic condition (wherein a river throws out distributaries and through them alters its course indefinitely) obtain, or have obtained quite recently, up to its very debouchure from the mountains. Within this period the Satlej,

instead of being as now confluent with the Beás, the Chenáb and the Indus, ran many score miles to the east of its present position, in an independent course through the Bikanír Desert to the Gulf of Kach.* It is even open to question whether the Jamna may not once have had a westerly course, as being identifiable with the Chitrang or with the famous Saraswatti, which can hardly have attained its celebrity as a sacred river, as at any time supplied by the water of the present Sarsuti, having its sources in the Sivalik ranges. The word "Jamna" may even suggest the name of the original distributary through which the Saraswatti first effected a junction with the Ganges at Prág, and through which the whole of the main stream from the Himalayas became ultimately drawn off from the western water-basin.

The features produced under the constructive phase river-action are readily apprehended, when not complicated by other influences. But there are features in the plains of Upper India which cannot easily be accounted for by this process; those where the river, as described in the last paragraph, runs in a well-defined broad valley bounded by steep banks high above the extreme flood level. The *primá facie* explanation of this state of things is, that the river, having formerly run at the level of the upland, has eroded the present khádir—a supposition involving an increased rate of fall, either through elevation in the upper region of the plains, or through depression in the region of discharge. There are tracts of this description in the Upper Punjab, but the best described instance of it is in the adjoining region to the east, forming the Jamna-Ganges Doab, from which it will be convenient to discuss the possibilities of the case. A "doab," being the triangular area between two confluent streams, exists of course under

* Calcutta Review for July 1874.

both phases of river-action; but the permanence of any particular doab depends upon the mode of action of the rivers forming it; and thus the permanent doabs are the types of the feature now under notice.

There are at least two independent considerations, suggesting different explanations from that of erosion, for the formation of the permanent "doabs." In the growth of river-deposits by the process so ably described by Mr. Fergusson in his essay on the Delta of the Ganges (*Jour., Geol. Soc., Lon., XIX, 121, 1863*), it must occasionally happen that some last line of ground lower than the rest remains to be filled up before the river can enter upon a fresh course of deposits. It seems enough to mention this case and to call to mind the form and proportions of the type features belonging to it, to see that it does not fit the position of the Punjab rivers.

But it is also at once apparent that the total conditions here are very different from those discussed by Mr. Fergusson, solely with reference to the deltaic region of a river; and this leads to the second consideration alluded to. In a delta the river is complete master of the ground; it has taken up all the streams that can properly be called its tributaries, and through its main channel and its distributaries of every degree it, more or less, embraces the whole area of deposition. One might understand from Mr. Fergusson's paper that he implies this to be the only form in which valley-deposits take place on a large scale. He admirably describes one stage of the struggle between a river and its tributaries, in the subdeltaic region; but he does not in argument or in illustration follow up the process of that struggle; and the general law he enunciates—that river-plains grow from below upwards—tends to put out of sight an operation which, as applied to the whole valley-plain, takes place in an opposite order. An examination of this phase of river-action suggests a totally different explanation, from the *primâ*

facie one just given, for the features of the ground in the plains of North-Western India.

The principle which causes the formation of land at the mouth of a river, the final stoppage of the current which had kept the earth particles in motion, is evidently one which must take effect in every shade of degree, with every change of velocity, and according to the amount and size of the earth particles in complete or partial suspension. Theoretically, deposition from water may take place at any slope, up to the limiting angle of repose in loose materials. By a combination of natural causes—changes in the slope of the river-bed owing to differences in the resisting power of the rocks in its channel and changes in the amount of water through periods of flood and of drought, with concomitant changes in the area subjected to abrasion, and hence in the amount of matter delivered to the river for transport—the conditions for the deposition of earth-particles must occur locally elsewhere than in the region of the delta. A special combination of these conditions occurs where rivers debouch from narrow gorges, pent up between precipitous mountain slopes; and we find accordingly in such positions extensive accumulations of recent water-borne materials. Deposits of this character are often called *diluvium*, as distinguished from the *alluvium* of tranquil inundation. The conditions for this diluvial formation exist in much greater force for the minor streams issuing from the hills between the great rivers than for the great rivers themselves. In proportion to their size, the steepness of the catchment-surface is much greater, and generally the rocks forming it are more easily abraded; but chiefly, these streams have little or no perennial sources yielding a large supply of clear water capable of effectually supplementing the carrying duty of the overloaded flood waters. Accordingly we find the surface of the ground along the foot of the hills rises rapidly between

the points of exit of the main rivers. West of the Ganges this diluvial watershed is 400 feet higher than the gorge of the Ganges. It was in these deposits at Behat, 10 miles from the hills, that Colonel Cautley dug out a buried village. The question then arises, how far may this mode of action account for the features of the doabs.

The shape of doabs in plan varies according to the circumstances of formation. In the region under notice they are generally long and pointed in the direction of the rivers forming them. Notwithstanding this elongated form and the general elevation of the area above the main river channels, there is little or no transverse drainage—there is no single line that can be called the watershed of the doab: the minor drainage also is longitudinal as regards the doab itself, *i. e.*, it is still transverse, like the main rivers, with reference to the dominant orographical feature of the country. Thus the cast of the water-courses in the plains of North-Western India, where the system has become more or less rigid, is still of the same type as in Northern Bengal, where the whole is in a state of oscillation. The question is, whether the contrast can be due to the different effects of the same conditions under different circumstances, causing the more rapid formation of deposits in the North-West; or whether, as was first noticed, the drainage in Upper India has become fixed by the effects of some general change of levels resulting in the erosion of the existing channels, the effects of the same change in the Lower Provinces having been to a great extent obliterated or covered up.

The fact mentioned regarding the base of the Ganges-Jamna Doab—that the streams from the Sivaliks had there accumulated a great diluvial deposit high above the levels of the rivers to east and west—very directly suggests the possibility of the Doab being a special growth from this source, rather than as carved

out of upraised deposits. The plausibility of this conjecture is not much affected by the fact that most of these minor torrents have at last sidled themselves into the main rivers at no great distance from the hills, thus obtaining a fall from which they cannot recover. The Hindan, however, which has its sources in torrents from the Sivaliks, still maintains its course through the Doab, falling into the Jamna some distance below Delhi; and there is no doubt that for a long way (how far there is no information) it is still a constructing river, not a denuding one. It may certainly be affirmed that the Soláni and Ratmú once held courses parallel to the Hindan down the centre of the Doab, where now runs the Káli, which has its origin in the Doab.

An extremely instructive illustration of this position occurs in the ground between the Jamna and the Satlej. The distance along the hills is nearly double that between the Ganges and Jamna; and instead of converging to form a doab, the rivers diverge; the Satlej, immediately after leaving the hills, flows away due westwards. Almost all the intervening hill-drainage, of which the Ghaggar and Márkanda are the principal streams, passes away south-westwards over the plains, never finding an outlet. Every drop of this drainage, as well as of the local rainfall, becomes dissipated by evaporation or absorbed into the ground. Thus, we have here an example of streams which have been from time immemorial (not a very long period) necessarily engaged wholly in construction, and still we find that the existing features of that ground does not differ very markedly from that of the Doab. On a line of section parallel to the hills at about 25 miles distant, through Ambála and Saháranpur, the outlines are remarkably similar: the highest ground is on both banks of the Jamna, 928 and 924 feet, that of the khádir being 876. The banks of the Márkanda and

the Hindan are on about the same level, 913 and 910 feet; and beyond both the ground falls,—eastwards to 875 at Roorkee, and westwards to 905 at Ambála and 871 about Sirhind; the level of the Hindan, when it leaves the Sivaliks, being about 1,400 feet, and that of the Ghaggar in a like position only about 1,150 feet. One must conclude that the Ghaggar and Márkanda have very extensively contributed to the formation of the surface as we find it; and whatever they have done the streams of the Doab seem to have very closely imitated them.

The chief difficulty against this view of doab-formation applies as much to the Trans-Jamna area: it is the fact that the highest ground in both areas lies along the very banks of the main rivers. This, as has been said, is the type-form for a constructing river; the Márkanda has it very markedly, the Hindan in a less degree, and it would be explicable on the supposition that the Jamna was so engaged when called upon to lower its channel in consequence of a rise towards the mountain region or of a depression of the region of the delta, and that the form then left has remained ever since. This feature seems, on the other hand, especially difficult to account for by the other process of doab-formation, as built up by river and rain-wash of materials derived from the base of the Doab. One can indeed scarcely attempt it without calling in the aid of another agency, namely, the wind. The power and method of this agency has been little observed, though often obscurely hinted at of late. Its introduction here is not purely gratuitous. It is not uncommon to find the high land along the rivers capped by purely wind-formed sand-hills called “bhúr land.” It remains for future investigation to say how far this action, aided by rain-wash, may contribute to form the high land upon which these sand-hills would superficially seem to be only an accidental wind-fall.

If, rejecting the supposition of elevation or depression, one were called upon to assign the circumstances which may have produced such different results from similar primary condition in Northern and Eastern India, it would not be unreasonable to suggest climatal differences. The arid climate of the Punjab, as compared with the humid climate of Bengal, certainly tends to the results indicated. It lays bare the earth to the full local effect of the rain-wash and the wind-scour; while at the same time it dissipates the water-power before it can half perform its duty as a carrying agent.

There are other facts known in the Punjab, and of the gravest practical importance, tending to confirm the considerations here suggested. To superficial observation, at least, it would seem that the *reh-scourge* must be connected with the atmospheric dissipation of the drainage water. There is apparently no connection between this superficial production of salts (in which sodium-sulphate is the prevailing ingredient) and the deep wells and the lakes of common salt-brine frequent in the region south and west of Delhi. These latter have not been examined, and are unexplained.

On the whole, one may for the present agree to a compromise upon this question of doab-formation. The plains near the hills to an unknown distance have been to a great extent formed and are still being added to by the deposits of the local hill streams. On the other hand, there is evidence elsewhere to confirm the opinion that the great rivers (at least the Jamna and the Ganges, the facts not being so well known for the Punjab rivers) have to some extent lowered their channels by erosion through more ancient deposits.

The beds these rivers now run in, through the southern region of the plains, contain the remains of extinct animals, and may be roughly classed as

pleistocene. Homotaxeously, *i. e.*, with reference to the *facies* of the extinct mammalian fauna, the bone beds of the Jamna, and the corresponding ones of the Narbada Valley, have been doubtfully affiliated to the pliocene period of Europe; but, according to any stratigraphical computation of lapsed time, they must be paralleled with the post-tertiaries. In the ossiferous gravels of the Narbada, a well-formed stone implement has been discovered.

No line of demarcation has as yet been attempted here between these lower beds and the most recent deposits, corresponding with the new and old alluvium of the Lower Provinces. The undertaking would be one of great difficulty, the superposition being conformable, organic remains being of very rare occurrence, and the lithological characters doubtfully distinguishable. The combined thickness is very great: at Ambála, where there is certainly an upper portion of very recent formation, a boring for an artesian well was sunk to a depth of over 700 feet, through a succession of alternating clay and sand beds, with some layers of coarse gravel in the lower levels. The lowest rock in the boring is a thick bed of clay, undistinguishable from some that may be found at the surface; or which, on the other hand, might be confounded with clays of the Sivaliks. It is not unlikely that the same range of formations occurs in the great valley-deposits of the Kábal river, and elsewhere.

II.—TERTIARY SERIES.

The tertiary series in the Punjab forms a great continuous belt of deposits. On the east, the outer zone of the Himalaya consists of these rocks; from the valley of the Jhilam they pass westwards, forming the Murree Hills, the whole of the Potwár, and up to the summits of the Salt Range; Trans-Indus they

form the Kohát Hills, passing westwards into the Afghán Hills, and south-westwards into connection with the Sulimán Ranges. Very little is known of them in these directions.

The outermost zone of the Himalayan region in North-Western India consists of a low fringing range of hills, reaching up to 3,000 feet above sea-level, or about 1,500 feet above their outer base, and formed of alternating clays, soft sandstones and conglomerates. The range almost everywhere occurs along a normal anticlinal flexure, the steep side of which is towards the plains. On this side the rocks are generally deeply denuded and covered up; almost the whole range being formed on the gentler, inner or north-easterly, dip of the strata, which become gradually flatter and more or less horizontal at and beyond this base of the range, thus forming wide longitudinal valleys known as "dúns."

Along the northern side of the dúns we find a second fringing range of hills higher than the outer range, and separated by well-marked longitudinal gorges and gaps from the main mountain mass. This second range is chiefly formed of very massive soft sandstones with subordinate beds of clay. The sandstone frequently contains sticks of lignite; but no deposit has as yet been found of any commercial value. The strata are generally much disturbed, and have a prevailing dip towards the mountains.

These features may be taken as a general type of the structure of what may be called the Sub-Himalayan Hills, formed of upper and middle tertiary rocks. The names of Cautley and Falconer will remain for all time associated with the history of these formations. Years of patient research enabled these discoverers to bring together an unrivalled collection of vertebrate fossils, the description of which was commenced by the publication of the *Fauna Antiqua Sivalensis*, and was left unfinished through the un-

timely and lamented death of Dr. Falconer. The title of this work was taken from the name given, or adopted, by Col. Cautley for the first range of low hills, separating the Dehra-Dún from the Plains, and was extended to designate the outermost range all along, or indeed all the ranges here described as Sub-Himalayan, for some of the Cautley collections were made at Náhan on the second range of hills. *

Later investigations, as was to be expected, have led to some necessary modification of the original views regarding these tertiary rocks. The discovery had begun and ended with the collecting of fossils, little or no attention having been paid to the stratigraphical features, which form the first and indispensable basis of all palæontological arrangement. The greater number of the fossils of the *Fauna Sivalensis* seem to have been found in the outer range of hills between the Jamna and the Satlej, outside the dún of Pinjor and Keárda; and it has been found that the strata forming those hills are separated from those of the inner range by a deep unconformity. The upper beds of the outer group abut against and overlap broken and weathered edges of the Náhan zone; and are therefore very much younger. It thus becomes a matter of great importance to separate these rock-groups on the ground, so that the fossils peculiar to each may be distinguished, and the faunas of the two periods compared. This undertaking is very easy in some places where the strata occur in

* The Fauna of these formations is a very abundant one, comprising—

Elephas, Mastodon, Dinotherium, Tapirus (Antoletherium), Rhinoceros, Hippopotamus (Tetraprotoda and Hexaprotoda), Merycopotamus, Anthracotherium? Sus, Chalicotherium, Equus, Hippotherium, Sivatherium, Camelus, Camelopardalis, Antilope, Bos, Cervus.

Hyæna, Amphicyon? Hyænarctos, Canis, Gulo, Vulpes, Felis, Machairodus, Lutra, Enhydriodon.

Pithecus, Semnopithecus.

Crocodylus, Leptorhynchus, Varanus, Colossochelys, Emys, Trionyx and numerous undetermined species of Aves, Pisces, Crustacea, and Mollusca.

abutting juxtaposition, as where the two ranges come in contact in the hills separating the Keárda and Pinjor Dúns. But elsewhere there is still much uncertainty. Colonel Cautley himself drew attention to the similarity of the rocks and fossils at Náhan to those found east of the Jamna at the south base of the original Sivalik Range; and here the strata pass upwards with apparent conformity into rocks which seem to be the same as those capping the younger series to west of the Jamna, so that if Colonel Cautley's identification were correct, as seems most likely, the original Sivalik Range is partly formed of rocks of the Náhan group, to an extent as yet undetermined.

This region between the Jamna and the Satlej is otherwise of peculiar interest in connection with the tertiary formations. We find here an extensive and well-marked representative of lower tertiary deposits. Orographically they belong to the higher mountains; the ridges of Kasaoli and Dagshai, which are formed of them, rising well up to the average elevation of the first ranges of the Southern Himalayas. And not only so, but the whole outlier is upraised on a basis of the slaty rocks of the mountains, which are found almost continuously in contact with the Náhan group along the inner boundary of the Sub-Himalayan Hills.

This group of eocene rocks is particularly well exposed at, and in the neighbourhood of, the three military hill-stations, Subáthu, Dagshai and Kasaoli, which happen to stand severally upon the distinctive beds forming three sub-groups or zones into which the formation may petrographically be divided. The bottom sub-group is well exposed at Subáthu, consisting of dull brown, gray and greenish indurated clays with subordinate bands of earthy limestone, in which there occur abundantly fossils characteristic of the

nummulitic period.* These beds are overlaid conformably and with alternating transition by a zone in which thick beds of red clay prevail, alternating with strong beds of purple or gray sandstone, as may be well seen in the ridge at Dagshai. In the ascending section sandstone prevails, to the exclusion of the red clays; and some of these upper beds at Kasaoli and elsewhere contain leaves of plants and of trees indicating the proximity of an abundant subtropical vegetation. There is thus a unity, as well as a diversity, in this group of rocks, passing in a uniform manner from the marine deposits at base to the fresh-water beds of tranquil deposition at top. It is important to keep this in view as bearing upon the relation of this group to the Náhan group. The bottom zone of the older group being nummulitic, the whole is provisionally classed as eocene. Some confusion has arisen from the name Subáthu having been applied to the whole group, as well as to designate the nummulitic zone proper. It were better to restrict the name to the latter use. The name Sirmúr might be adopted for the whole group, the eastern end and a considerable portion of the outlier being within that State.

Some features of the primary relation of these eocene deposits to the rocks of the mountains have been made out with considerable certainty. The Subáthu beds do not rest upon the highest members of the adjoining rock-series; there is therefore deep unconformity. The same conclusion is involved in the fact of very sudden variations of thickness in the Subáthu group. It would appear, however, that the supporting strata had not undergone any disturbance involving general contortion, for at Subáthu itself there is a well-marked case of local conformity—a bottom rock of the younger series resting, over a

* Described in D'Archiac and Haime's *Groupe Nummulitique de l' Inde*.

considerable area, upon the same bed of the slate series, and both now involved in the same flexures. These facts would prove that although some general elevation of the mountain area, involving deep denudation of the rocks, had occurred here prior to the tertiary period, none of the special disturbance characteristic of the existing mountain system, and now so specially marked in this fringing zone, took place till after the deposition of the eocene rocks. The Sirmúr group exhibits much more intense and varied disturbance than is at all general in the Náhan group.

The Sirmúr group stops out at some 15 miles west of the Jamna. It does so distinctly by elevation of the whole mass to eastwards, the last out-crop being of the Subáthu zone, and on a ridge some 10 miles east-by-north of Náhan, the capital of Sirmúr. The only other known remnant of these eocene deposits along the whole southern face of the Himalayan Range to eastwards occurs near the village of Bón on the ridge above the Ganges east of Rikikés. To the westwards, the group is more or less continuous; but relatively it shows depression in that direction, the Subáthu zone disappearing from a short distance beyond the Satlej by gradual suppression along both boundaries, with a corresponding spread of the overlying sandstone and clay deposits, which henceforth occupy the whole out-crop of the group, up to the Rávi. The stations of Bágsu and Dharm-sála are on this band.

The actual present relation of these eocene deposits to the older rocks is of course very intricate, all having undergone intense crushing together. This is most apparent when the softer beds of the Subáthu zone are those at the contact, as is often the case in the lower levels. Where the strong-bedded firm sandstones of the upper zones are the contact rocks, the structure is better defined, and it is almost invariably found that the younger strata dip

steeply towards the older. This is well seen along the south flanks of the Boj Mountain, north of Dagshai; and it is constant along the boundary to the north-west. The aboriginal relations already indicated for these two rock series suggest that this present prevailing structural feature, in steeply abutting masses, may at least sometimes be only a modification of the original form of juxtaposition from deposition.

The original relations (which are always the most important) of the eocene to the next younger group are even less fixed than those with the underlying series, because the rocks are only found in contact along a single well-defined boundary. East of the Satlej this boundary corresponds with the base of the principal mountain slope, and the slates beneath the Subáthu beds are there frequently found at the contact with the Náhan beds. Beyond the Satlej the gradual depression of the eocene group westward, along the continuation of the same boundary line, soon brings the upper arenaceous zones into juxtaposition with the similar deposits of the Náhan group, obscuring the separation of the formations. The fact already noticed of the Sirmúr group having a well-marked upper zone that has not been detected outside the main boundary, among the Náhan rocks, is strongly suggestive of total stratigraphical distinctness. There are other characters too in both groups indicating that the present boundary was in some manner a well-defined feature at the time of deposition of the Náhan rocks; that the eocene group had undergone crushing, elevation, and denudation prior to the formation of the younger rocks now in contact with it.

It has now been shown that in this region of the Himalaya, which may comprehensively be called the Simla region, there are three well-marked and largely developed formations of the tertiary period. Eastwards, the oldest group disappears, owing to elevation

and removal; the youngest group also is doubtfully represented in that direction. Beyond the Ganges, in Rohilkand, the outermost hills belong to the second belt of Sub-Himalayan Hills, the Sivalik Range being very poorly represented. To the north-west, on the contrary, the Sub-Himalayan Hills take a great expansion in the Kángra region. This is partly due to a slight advance of the Trans-Satlej Sivalik Range; but principally to the marked northerly retreat of the higher ranges of mountains, formed of the eocene and older rocks. The continuation of the Sirmúr group, though reduced to a very narrow band, is easily traced up to the Rávi. The separation of the Náhan and Sivalik groups in the succession of ridges and dúnns traversed by the Beás has not yet been worked out. At the Rávi we come upon Kashmir territory, and all information ceases. The Maharajah, some years ago, made a demonstration of interest, rather commercial than scientific, in geological researches, by appointing a very competent geologist from England. But although the information condensed in the foregoing sketch has been published for more than ten years, we still know nothing of how these rocks lie beyond the border. It must be presumed that the defect is due rather to the obstructiveness of native ignorance and prejudices than to any lack of zeal or ability on the part of Mr. Drew.

To the west of Kashmir, along the Jhílam, the tertiary rock-series again crosses into British territory, being undoubtedly continuous intermediately. Some of the zones are specifically identifiable with those described in the Simla region; but the total stratigraphical relations are greatly changed. The ridge on which the station of Murree (Mari) is built is formed of rocks exactly like those of the Dagshai zone; and these are transitionally associated with underlying nummulitic strata of the very same character as those of Subathu. In the ascending series

passing south-east from Murree, less exact assimilation can be made. There are massive sandstones with frequent nests of lignite, just like the Náhan rock; and these pass upwards into beds in which coarse conglomerates prevail, like those capping the Sivalik group to eastwards. In this western region, however, no trace has been detected of the strongly marked features that have been described to the east as dividing the tertiary series into three well-defined groups. The best-determined locally of those divisions, although as yet the least determinate in distribution, is that between the Náhan and the Sivalik; and on this point the discrepancy between the eastern and western sections may be got over (as suggested by Mr. Theobald, who is now working out these questions in the eastern region) by finding that the Sivaliks are not represented at all in the conformable series between Murree and Jhiliam, all the upper beds here being perhaps Náhan. There would still remain the lower division, which in the east is physically the best marked, between the Náhan and Sirmúr groups; but of which no trace is observed west of the Jhiliam. The patent way of solving this case would be to suppose the separation in the east to be simply a fault-boundary; so that here too the two lower groups may originally have been continuous and transitional. This solution would ignore or reject the internal evidence for the completeness and independence of the Sirmúr and Náhan groups in the Simla region.

In the descending section, going north-west from Murree, similar discrepancies are found. There is, indeed, a very well-defined general boundary between the ground formed of the Subáthu group with its overlying series and that formed of older rocks; and this boundary structurally resembles that often found at the same horizon in the Simla region. But Mr. Wynne has found that the principal rock of the underlying series forming the higher ranges west of

Murree, is itself a nummulitic limestone, which is locally seen, as might be expected, in conformable sequence with the Subáthu beds. In descending order, moreover, this limestone is in approximate parallelism with upper secondary strata. Thus, to whatever extent faulting must be introduced to explain the features of the section in the Murree region, it would not bring it into uniformity with that in the Simla region; for there, as has been described, the Subáthu beds rest upon rocks which underlie the next oldest formation, which itself is thought to be triassic.

Supposing the foregoing observations to be correct, the plain inference would be that the disturbances marking the Himalayan system are of earlier date than those on the lines of the Hindu Kôh; that in early or middle secondary times a general elevation occurred of the South Himalayan area, along the border of which the Sirmúr deposits subsequently took place; that the eocene period was closed by the more special disturbance with crushing which constituted perhaps the principal phase of the mountain upheaval; that after a period of denudation the Náhan deposits set in; that a similar interruption produced the break between the Náhan and Sivalik groups; that during all that time, or at least till the close of the Náhan period, little or no disturbance took place in the regions west of the Jhilam.

The meeting of the two systems of flexure takes place approximately along the valley of the Jhilam, between the station of that name and Mozaffarábád, where the course of the river makes a sharp bend from the direction of the Kashmir Valley. The boundary of the eocene rocks forms a deep acute angle up the valley, the strike on the west side gradually turning into a south-west and west direction. The Potwár, or plateau of Ráwalpindi is, on the whole, a broad synclinal of the tertiary series, the lower members of which rise again to the south,

along the north side of the Salt Range; the highest summits of this being formed of nummulitic limestone. Westwards the tertiary series forms the whole of the Kohát District Trans-Indus. Beyond this it crosses the Kuram river into Afghanistan, and, according to Drs. Fleming and Verchere, flanks the Sulimán Mountains along much of the western frontier of the province.

III.—THE HIMALAYAN REGION.

Some of the most important observations we possess regarding the history of the Himalaya have been already noticed in the description of the tertiary series now found along the south margin of the mountains. It may be suggested that certain well-known facts in the composition of the central mountain regions are incompatible with the inferences then made: many years ago Dr. Thomson in Western and Dr. Hooker in Eastern Tibet discovered nummulitic strata at great elevations, of course proving that what are now the highest regions were beneath the sea in early tertiary times. One is then very likely to assume that the nummulitic deposits were originally continuous over the intervening area, where we have already seen reason to suppose dry land to have existed at that time. The fallacy which suggests this assumption is one that has to answer for many geological mistakes; it is the tendency to lose sight of the natural proportion between elevations and distances. If the features under notice be plotted to scale, this apparent difficulty to accepting the indications derived from the characters of the Sirmúr group will scarcely be felt. Besides, a *primá facie* surmise should generally give way to anything like positive observation.

Very little categorical information can as yet be given regarding the older rocks of the Southern

Himalaya—that broad area of mountains of moderate elevation lying between the snowy range and the alluvial plains. A very general feature of this area is the presence of limestone-capped ridges along its margin. It is so at least from the Beás to the frontier of Nepál. The local picturesqueness of Masuri and Naini Tál is due to the rugged forms assumed by this limestone. The rock is itself earthy, compact or sparsely oolitic, and is underlaid by flaggy clay-slates. It is again in the Simla region that we find the best sections revealing what seems to be the normal order of these deposits. Travellers by the new road cannot fail to notice the peculiar features of the Boj, Kanoj and Krol mountains facing the Solan rest-house on the south, east, and north. It seems certain from its position here that this limestone is the youngest group of the series, and it has been named the Krol group. At its base there is generally a variable thickness of a coarsish quartz sandstone, which sometimes assumes a considerable thickness, and in a manner replacing the limestone. Below it there is generally observed a strong band of black, slightly carbonaceous shales, which pass down conformably into the slaty shales and flags forming the base of these mountains to the lowest levels exposed in the deep gorges. In positions of greater disturbance, the limestone itself is found far down in the valleys.

At a depth of a thousand feet or more, below the base of the Krol group, a thin band of rocks has been observed, which from its well-marked characters and wide distribution promises to be most useful as a provisional horizon in unravelling the intricate structure of these rocks. It is a dense limestone of clear pink, grey, or yellow colour, with which there is often associated a bed of coarse conglomerate. It is well exposed in the windings of the Blini stream, to the north-west of Solan, and hence it has been called the Blini limestone. This rock has been found con-

stant in character and position as far to the east as Naini Tál, also in the interior—beneath Simla, and far up the valley of the Tons. The strata below it are very like those immediately above it; but there is some advantage in being able even to fix an Infra-Blini horizon in this great mass of deposits, in which as yet no fossils have been detected. The zone above the Blini limestone is vaguely designated as Infra-Krol.

From some points of petrological similarity between the rock-series here and that seen north of the snows, Dr. Stoliczka has conjectured that the Blini and Infra-Blini beds may correspond with members of his Múth and Bhábeh series, of upper and lower silurian age. For similar reasons he is disposed to think the Krol group to represent his Liláng series (triassic); and the Infra-Krol, or at least the upper part of that zone, as corresponding with his Kuling series of the Central Himalaya, and of the carboniferous period.

Before crossing the snows we may notice some other relations of these formations in the South-Himalayan region. Along the north-east base of the Krol, at Kundah Ghât, and passing down the gorge of the Lower Giri, there is a line of intense crushing, with elevation on the north-east, so that along nearly the whole way to Simla the road is over the flaggy slates of the lower formations. At Simla itself there is an admirable illustration of how the metamorphism of rocks is often independent of the influence of central heat, and due to local conditions of crushing. The whole peak of Jako down to the level of the station is formed of micaceous, hornblendic and garnetiferous schists, with abundant quartz-veining—thoroughly foliated metamorphic rocks; while all round the flanks of the mountain below the station the flaggy slates are no more mineralized than in the gorges below the Krol. At several points round Simla, as on the spur below the Yarrows and on Chota Simla, the Blini

group is well seen. From its horizon upwards the thickness of rock to the top of Jako would more than include the Infra-Krol zone; and so it may be that the highly quartzose rocks of Jako and Boileauganj Hills, with the similar rocks of Tára Dévi, on the south-side of the synclinal, may represent the lower Krol sandstone, expanded at the expense of the limestone, and thus suggesting a local shallowing of the triassic sea.

In passing along the ridge to the north-east from Simla, there is great sameness in the characters of the rocks, which are still of the Infra-Blini series, or Simla slates. There are several lines of intense crushing and contortion, generally found at the gaps, but apparently unattended by great dislocation, for no new rock appears along these lines; and for the most part the slates lie flatly, or with a moderate northeasterly inclination. Again we find the rocks on the Máhásu ridge more metamorphosed than the beds on which they rest. Towards Mattiáni there are symptoms of gradual general metamorphism of the slates. At Nárkanda this change is very decided; and here these slaty schists pass into the flanks of Hatu Mountain, the top of which is formed of massive beds of gneiss, lying nearly horizontally. It would seem as if this again may be only a stronger instance of what has been observed already—the greater metamorphism of the upper beds of the series—and that the gneiss of Hatu may be a transformed member of the rock-series described in the region of the Krol. Descending from Nárkanda northwards into the valley of the Satlej the schists are found resting on other massive gneiss under Kotgarh; but they continue to form the gorge of the river at Rámpur and Sáráhan, up to Tránda; beyond which village they pass with increased contortion into what has been called the central gneiss, forming the southern basement of the great Snowy Range. The chief characteristic of this

central gneiss seems to be the prevalence in it of ramifying veins of albite-granite.

The passage from the unaltered to the gneissic rocks is not generally so gradual as that described along the Simla watershed; and the opposite character seems connected with a peculiar feature in the distribution of the upper members of our rock series. It is up the great river valleys that the younger rocks in their unaltered condition are found to extend farthest into the mountain region. This is very marked in the valleys of the Satlej and Beás. In the former to above Málgí, and in the latter to above Plách, rocks identifiable with the limestones and shaly slates of the Krol and Infra-Krol groups are found deeply buried between lofty ridges of gneissic rocks: into the base of which they seem to pass, with an actually overhanging plane of contact, the out-crop of which forms an inward slope on the sides of the valley. Trappean intrusion is an accompanying feature in these areas of depression; whereas along the whole ridge from Hatu to the Plains, only one small trap dyke has been observed, near Nárkanda.

West of the Satlej the region described as the Southern Himalayan area becomes extinct; the outer line of the hills bends rapidly northwards, not recovering its normal north-westerly trend till it merges into the Dháoládhár Range, which is a lofty ridge of gneiss, exactly on the strike of the Snowy Range to the south-east, and itself little below the level of perpetual snow. These changes of feature are as marked stratigraphically as orographically. The strike of the rocks turns with the trend of the mountains, and we find along the base of the Dháoládhár a compressed edition of the Simla section—a fringing eocene band, then a narrow zone of unaltered slaty rocks, then a belt of foliated schists next to the core of massive gneiss, and all, according to dips, in apparent reverse order. The slates bend round the north-west

point of the Dháoládhár, under Dalhousie, coalescing with similar rocks to the north of the range in the Chamba Valley, and so cross the Rávi into Kashmir, to form the Pir Panjál Range, which structurally belongs rather to the Central Himalayan region.

Our knowledge of the Central Himalaya is in some degree the converse of what we know of the southern region. In the latter there is little certitude of the precise horizons of the several rock groups on the standard scale, but we have a fair preliminary knowledge of the distribution and arrangement of those groups; whereas of the central region we have a very full definition of the recognised equivalents of the several formations, with but little information of their structural relations. This is owing, on the one hand, to the great difficulty of moving about in the higher regions; and on the other, to the pretty free distribution of fossils, enabling the qualified observer, sometimes by a single observation, to determine the normal position of the strata. The following formations have been identified by Dr. Stoliczka as occurring in Tibet. With the help of the published account of his observations on his journey to Kashgar, we are able to give a sketch of their distribution on one complete section of the mountain system.

DR. STOLICZKA'S TABLE OF FORMATIONS IN THE CENTRAL HIMALAYA.

	<i>Age.</i>	<i>Group.</i>	<i>Fossils.</i>
IV.—RIVER AND LACUSTRINE DEPOSITS.			
III.—TERTIARY.—Nummulitic	...	Indus or Shingo Beds.	
II.—SECONDARY.—Cretaceous	...	Chikkim Beds	
„	Jurassic (Upper)	Gieumal Sand- stone.	<i>Avicula echinata.</i>
„	Jurassic (Braun Jura).	... Spiti Shales...	<i>Ammonites macro- cephalus, Parkinsoni, triplicatus, etc.</i>

	Age.	Group.	Fossils.
II.—SECONDARY.—	Middle Lias	... Upper Tagling Limestone.	<i>Trochus epulus</i> , <i>Chemnitzia undulata</i> , <i>Terebratula sinemuriensis</i> , <i>Ammonites macrocephalus</i> , <i>Parkinsoni</i> , <i>triplicatus</i> , etc.
„	Lower Lias	... Lower Tagling Limestone.	<i>Terebratula gregaria</i> and <i>pyriformis</i> , <i>Rhynchonella Austriaca</i> , <i>Belemnites</i> .
„	Rhætic	... Para Limestone.	<i>Megalodon triqueter</i> . <i>Dicerocardium Himalayense</i> .
„	Triassic (Upper)	Lilang Series	<i>Halobia Lommeli</i> , <i>Ammonites floridus</i> , etc.
I.—PALÆOZOIC.—	Carboniferous	... Kuling Series	<i>Productus semireticulatus</i> , <i>Spirifer Keilhavii</i> , etc.
„	Upper Silurian	Muth Series	<i>Tentaculites</i> , <i>Orthis</i> , etc.
„	Lower Silurian	Bhábeh Series	<i>Orthis</i> ?

GNEISS, METAMORPHIC SCHISTS, etc.

There appear to be three principal axes of gneissic rocks—one in the Himalayan Range, one along the right bank of the Upper Indus, and one forming the ridge of the Kuenlún. The first of these is that already spoken of as the central gneiss, forming the southern basement of the Snowy Range of the Himalaya Proper. The great lines and groups of peaks are formed of palæozoic strata resting on the northern shoulders of the crystalline mass. Dr. Stoliczka considers this to be the primary axis of Himalayan elevation. It is only in this sense, or with reference to the Himalayan chain only, that it can be called the central gneiss; for geographically, the gneiss of the Indus is approximately in the centre of the whole mountain mass.

The central gneiss, and indeed the Himalayan range itself, undergoes interruption and divergence

in the region of the Satlej. Directly on the prolongation of the range there is the gneissic ridge of the Dháoládhár, the structure of which is very analogous to that of the Himalaya; but the valley of Kulu intervenes, in which we find only a succession of crystalline schists in the position of the supposed mountain axis. As a mere question of watershed, the Bhábeh pass of the Trans-Satlej Himalaya is continuous with the ridge of the Rotàng Pass, at the head of the Kulu Valley, and so with the Pir Panjál Range, separating Kashmir from the Plains. But as the culminating range of mountains, the Zánskar Ridge must be taken as the proper continuation to the north-west of the great chain of the Eastern Himalaya. We find too on its south-western base, at the Bárálácha Pass, a gneiss very similar to the central gneiss of the Bhábeh Pass; it is not yet known whether the two are continuous. This feature, however, certainly disappears to the north-west. At the Zojilá Pass, between Drás and Kashmir, the whole ridge is formed of metamorphic schists, (which Dr. Stoliczka conjectures to be palæozoic), flanked on both sides by triassic limestone.

The gneissic axis of the Ladák Range is known for a considerable distance to have a very steady north-westerly course along the Indus, forming the ridge between that river and the Lower Shyok. It is not like the central gneiss, being freely associated with syenitic and other crystalline schists.

The third gneissic axis is the ridge of the Kuenlún; but of it we only know what appears on a single section. It too is described as syenitic.

The most interesting formations are, of course, the unaltered fossiliferous strata between the axes of crystalline rocks. Geologically we must speak of them as basins, though they form the highest ground of Tibet. There are two of these stratigraphical basins, separated by the Ladák syenitic range—that on the

north is the Korákoram region, that on the south comprehends the Tibetan districts of Záskar, Western Rukshu and Spiti. These ridges and basins are, of course, only the leading structural features, and are subject to many irregularities. The Spiti basin is nearly, if not entirely, cut off on the south-east by a mass of gneissic and metamorphic rock in the region Shálkar, separating it from the basin of similar formations in a corresponding position to the east, in the region of the Upper Satlej. The escape of the Satlej from the upper regions at this point is no doubt connected with this block of crystalline rocks. Again, far to the north-west, near the Shingo river, this long basin of fossiliferous strata is stopped out by the granitic and syenitic mass of Little Tibet. The Záskar ridge here being, as already mentioned, composed of altered palæozoic rocks, the sedimentary series of Tibet is in a manner continuous with that of the Kashmir Valley.

The most peculiar feature in the distribution of these formations is, that the middle and upper secondary groups—the liassic, oolitic and cretaceous—seem to be confined to the Tibetan basin. Here they occupy the greater part of an elliptical area nearly 200 miles long by 30 broad, their thickness being considerable; while in the Korákoram basin Dr. Stoliczka only observed palæozoic and triassic strata. Similarly in the Kashmir basin, triassic and carboniferous rocks are the youngest as yet observed; the limestone of the spurs along the north side of the valley being of the latter formation. It is not unlikely, however, that remnants of the other groups may yet be found here, as upper secondary rocks occur again in the Trans-Jhelum region.

The condition of the nummulitic formation in the Tibetan regions is one of the most curious features of the mountain structure. It does not occur in sequence with the upper secondary series of the Tibetan basin; but as it were wedged in along the

Indus Valley, between the gneissic rocks of the Ladák Range and the metamorphic and palæozoic rocks forming the northern out-crop of that basin. There seems to be a great thickness of these eocene deposits; principally strong sandstones and rusty clays very similar to the corresponding deposits of Dagshai and Murree on the south margin of the mountains. In the upper regions they have undergone considerable metamorphism locally. Up the Indus to the south-east there is an extensive mass of basic eruptive rock intruded between the nummulitics and the metamorphic mass of Tshomorari. In the Korákoram region Dr. Stoliczka thought he recognised some sandstones of this type about the hot springs of Kium in the Chang Chenmo Valley.

Low down on the northern flanks of the Kuenlún, about Sánju, Dr. Stoliczka found remnants of both carboniferous and of cretaceous strata, resting unconformably upon metamorphic schists. These strata do not seem to affect the structure, so prevalent at the base of the Himalayan range, of inclining towards the mountain axis.

Eruptive rocks proper do not occur freely throughout the mountains. We may perhaps rank in this category the albite-granite found ramifying through the central gneiss; and which, according to Captain R. Strachey's account penetrates the overlying palæozoic slates in the range north of Kumaon. The epidote, diallage and serpentine rocks, already mentioned as in contact with the nummulitic deposits on the Puga and Hánle rivers near their confluence with the Indus, form a very remarkable mass of presumably eruptive rock. But the most interesting exhibition of igneous rock, and apparently of phenomena that may rank as volcanic, is in and round the valley of Kashmir; upon which, however, special information is still wanting.

The river and lake deposits of the great valleys and high-level plateaus of the Himalayas, or, as they have been called, *Karéwah* deposits, from the vernacular name applied to these terraces in Kashmir, form a most interesting object of study, but have as yet received only casual observation. In many cases these accumulations have no doubt been caused by temporary obstructions of the water-way, whether by glaciers or by enormous landslips; it remains to be seen whether crust-movements may not also have contributed to their formation. It is in the more central regions, towards the head waters of the Indus and the Satlej, that the most extensive deposits of this formation are found, where they attain a thickness of nearly 3,000 feet. The shells found in them often indicate climatal conditions different from those that now obtain in the same locality; and in some places the bones of large mammalia of extinct species identifiable with those of the Sivalik fauna, testify to the great antiquity of these deposits.

No geological period has attracted more attention than has been given lately to the glacial period, which in Europe is fully recognised as altogether post-tertiary, and as due in great measure to cosmical, not local conditions. There is ample evidence of a former great extension of glaciers in the Himalaya; and the admitted approximation of the periods is so close as to give very strong presumptive evidence against the separation of the two, based upon very immature palæontological reasoning. The phenomena in question are only conspicuously exhibited in the Kángra Dún, a fact evidently connected with the close proximity of the lofty Dháoládhár Range, where in the upland recesses *névé* may still be found at all seasons. No doubt, however, all the Himalayan glaciers were then enormously more extended than now.

IV.—THE SALT RANGE.*

The Salt Range possesses geological features in the province peculiarly its own. Its geology is at present chiefly known to the public by the able report of Dr. Fleming, and by a paper, also in the Bengal Asiatic Society's journal, contributed by Mr. Theobald, but references to it in the works of other writers are very numerous. Having been examined and mapped by the Geological Survey it was found to present a complex arrangement, inasmuch as its strata afford almost entirely different sections at either end. No sensible unconformity was observed throughout the whole series.

The sequence may be represented as follows (those rocks limited to the eastern or western exposures being noted below) :—

SALT-RANGE ROCKS.

TERTIARY.—	Sandstone Series (perhaps Miocene), Sivalik.	Green and purplish-grey sandstones alternating with red clays or shales. Fossil timber, reptilian bones, tortoise plates, &c. Upper beds soft, with conglomerates and bands in which mammalian bones are numerous. <i>Latter, Salt Range East.</i>
DITTO.—Eocene	...	Nummulitic limestones and shales, with coal and alum shale, usually below. Fossils numerous. <i>Salt Range East and West.</i>
CRETACEOUS?	...	Olive sandstone, shale and conglomerate; series generally unfossiliferous or but slightly so. <i>Salt Range East.</i>
JURASSIC	...	Variegated sandstones, limestones, marls, golden oolite. Fossiliferous. <i>Salt Range West.</i>
TRIASSIC	...	Grey and greenish clays or shales, limestones, &c. Fossiliferous, <i>ceratites</i> numerous, &c., &c. <i>West Salt Range.</i>
DITTO.—Probably	...	Red, salt-pseudomorph group; flagstones, sandstones and clays, unfossiliferous. <i>Salt Range East.</i>
CARBONIFEROUS	...	Limestones, sandstones, shales, highly fossiliferous. <i>West Salt Range.</i> Bastard limestones or magnesian calcareous sandstone? <i>East Salt Range.</i>

* This section is by Mr. A. B. Wynne.

UPPER RED SANDSTONE	Red and light-coloured, variegated or speckled sandstones and lavender clays. <i>Middle Salt Range.</i>
SILURIAN	... Black micaceous shales and flaggy bands, calcareous glauconitic layers, fossils, <i>obolus</i> or <i>siphonotreta</i> . <i>East Salt Range, extending far towards west.</i>
LOWER PURPLE SANDSTONE.	Dull purple sandstone, parts saline, unfossiliferous. <i>East and West Salt Range.</i>
VOLCANIC TUFFA AND CLAY	... } Small bed. <i>East Salt Range.</i>
GYPSEOUS AND ROCK SALT SERIES.	Massive beds of gypsum and bright scarlet gypseous marl overlying rock salt, ascertained in <i>East Salt Range</i> to have a thickness of 600 feet, 225 of which is pure. <i>East and West Salt Range.</i>

The sections of the Salt Range are well seen in all its southern acclivities and in the profound rocky gorges by which its escarpment is intersected. The rocks along the latter are often thrown into the wildest disorder by landslips and faults: but the key to the arrangement having been gained in the gorges, the structure of the displaced masses and frequently some idea of their former positions can be worked out.

The minerals of the range include, as well as the enormous salt deposits, a frequently recurring thin band of coal and carbonaceous shale much charged with iron pyrites, which reduces its value as a fuel.

The salt is the lowest and oldest rock known in the Salt Range, where its presence and its solubility, together with the unstable nature of the associated beds, have doubtless resulted in the confusion and concealment affecting so strongly the whole of the inferior portion of the series. Its geological history is as mysterious as is usually the case with such deposits; and (as is the case elsewhere) wherever the sections are most clear the gypsum is found to overlie it. Although its thickness where most accurately known, as at Khiurah, Mayo Mines, is enormous, the very conditions under which it may with probability be assumed to have been accumulated, in detached basins,

almost preclude the inference that it extends everywhere beneath the range as one vast sheet. The local disturbance too, above indicated, may naturally point to its extensive removal by percolation of fresh water. Notwithstanding this, however, its presence at numerous localities almost along the whole southern foot of the mountains for a distance of 116 miles, and often with thick out-crops, leaves little necessity to qualify the assertion that the supply is practically inexhaustible. The annual returns show that the out-turn of salt from the range equals in maunds 12 to 13 lacs, producing a revenue of 40 lacs of rupees or £400,000 *sterling* yearly.

The salt is of a reddish or white colour, in thick bands of great purity, alternating with other thick layers of more impure and earthy character, called by the miners *Kuller*. Between some of these strata at Khiurah, a stratum of potassium salt was found last year, having a thickness of a few feet. But from more recent workings it appears that the deposit is of lenticular shape and limited in size to some 600 superficial feet (as estimated by Dr. Warth, Collector, Mayo Mines).

The rock salt of the range is not known to be bituminous itself, but layers of highly bituminous shale are found in the gypsum at Khiurah overlying the salt deposits.

Near the place where the latter occurs, and in a few other situations apparently on the same horizon in the eastern part of the range, is an interbedded mass of volcanic tufa, porphyritic by the presence of numerous small crystalline needles of a semi-transparent mineral. Together with this are some feet of lavender-coloured clay occasionally containing talcose veins. It is used as soap by the natives.

The sandstone immediately overlying the salt series has yielded no fossils to assist in determining the age of the latter; but in the next widely extended

group, some hundreds of feet above it, definite forms of an *obolus*, or *siphonotreta*, occur in considerable numbers; so that the salt cannot be more recent than silurian. Dr. Fleming referred it to the devonian period, having satisfied himself of its pre-carboniferous age, but the above-named fossils prove it older still.

The ages of the various groups of strata overlying these silurian beds have been likewise provisionally fixed by their fossil remains wherever practicable, their positions in the series being generally definite. In the absence of organisms, and where there was nothing from which to form a fair conjecture with a preponderance towards certainty, the groups have received local or general names only, leaving their actual age an open question.

The continuation of the Salt Range Trans-Indus repeats some of the formations of the Cis-Indus region, the tertiary sandstones, nummulitic limestones, cretaceous, jurassic and carboniferous rocks of similar types being present. The detailed examination of these has as yet been limited by circumstances to a few localities; at one of which, in the gorge of the Chichali Pass, a remarkably complicated inversion and fracture of the series has taken place. These mountains present to the south and east lofty mural precipices of the nummulitic limestone and older rocks, which are steeply overlaid in an opposite direction by tertiary sandstones, clays and conglomerates, the uppermost beds of which have the entire character of the coarse pebble beds made up of crystalline rock débris, which are found to terminate the upper tertiary groups elsewhere in the Himalayan region.

Further south near Esakheyl the tertiary sandstones were found by Dr. Waagen to rest directly against the carboniferous limestone; and still further south, according to Dr. Verchere, the jurassic rocks

appear at Sheik Budin, a locality often indicated as remarkable for its fossil bones.

The Potwár or plateau of Ráwal Pindi is almost entirely occupied by the tertiary sandstones, &c., the isolated nummulitic ridge of Khairí Múrat, west-by-south from Ráwal Pindi, being an exception. They rise into high mountains west of the valley of the Jhilam, and in the Kashmir territory, between that river and the Pir Panjál Range. Beyond the Indus, too, in the Kohát District, they form hilly ground, being interrupted by numerous narrow, distorted, overthrown, and fractured anticlinal folds of the nummulitic limestone (here much less thick than on the Salt Range), within which are enclosed the rock salt and gypsum series of the Kohát salt region.

In all the numerous exposures of this Kohát series (as in that of the Salt Range) no older rock than the salt has been discovered; and, as a rule, both it and the gypsum follow the curves of the adjacent and newer limestone, where the stratification can be observed. Rock salt may be of almost any age; but this apparent conformity and the utter absence of all proof that the series is older led to the inference that the salt, gypsum, &c., of the Kohát region is of nummulitic age, or immediately antecedent thereto, the supposition being less violent than the assumption that this salt series is contemporaneous with that of the Salt Range, while all the intervening formations from the infra-silurian sandstones to the jurassic or cretaceous inclusive should have disappeared by gradual thinning-out. It is difficult to conceive conditions which would admit of such a series tranquilly surviving through all the changes of the vast geological periods required for the accumulation of eight or nine, more or less largely developed, formations, belonging to palæozoic and mesozoic epochs, in the vicinity too of a highly disturbed region, while the geographical distance from one or

more of these frequently wide-spreading, if detached, formations appears hardly sufficient to account for the absence of them all.

The supposition that the two salt series belong to different ages is further supported by certain differences of their aspects when examined in detail, the most prominent of which is, perhaps, the grey color of the Kohát salt and its accompanying clays, as compared with the red or white colours of the Cis-Indus salt series.

A few words will describe the series of this Kohát district. Taking the rock salt as the oldest rock seen it occupies a very prominent place lithologically in some of the sections.

In the Bahádúr Kheyl anticlinal it may be continuously traced either uncovered or but slightly concealed for a distance of about eight miles, having a width sometimes exceeding $\frac{1}{4}$ mile and a thickness, at one place, estimated from its perfectly seen dip, of more than 1,000 feet. It is exposed along the valley of a small river sometimes forming hills of 200 feet in height almost entirely composed of naked salt beds. No such exposure as this occurs anywhere in the Salt Range proper; and unless exceeded at the islands of Ormuz in the Persian Gulf or in the deposits of Western Asia, it is probably one of the largest in the whole world. But this is only a small and narrow part of one of the elongated salt tracts containing numerous other large exposures of the mineral throughout a length of more than 40 miles. The revenue from the Trans-Indus salt, at about one-fourteenth of the Cis-Indus rate, comes to Rs. 60,000 (£6,000) per annum.

The general character of the salt is a more or less crystalline mass with numerous transparent blotches; the color varies of different tints of grey, when not quite transparent. It is in some places dark, almost black, and then smells strongly of petroleum.

A few bands only contain sufficient of dark grey silty clay to render it unsaleable to the merchants; while the pure mineral exists in greater quantity. No such impure earthy bands as separate the Khiurah salt-beds occur throughout the whole region; and this salt is often so crystalline that its stratification is difficult to detect even on weathered surfaces.

The salt is overlaid by white and grey gypsum and grey or greenish gypseous clays generally much confused as to stratification, and in this resembling the Salt Range series; but the lithological aspect and color of these gypseous strata is perhaps as distinct as possible in the two regions. The gypsum varies in thickness, and occupies large areas over the axes of the anticlinal curves. Associated with it are some layers of alum shale, and it is sometimes black and bituminous like the salt.

Overlying the gypsum is a thick deposit of blood-red clay, having a few sandy layers and near the top a double band of coarse purple (sometimes conglomeratic) sandstone, containing a few fragments of fossil bones.

The red clay is conformably succeeded by the nummulitic limestone—shaly below, approaching the character of that of the Salt Range, and in some places having among the lowest beds small layers of carbonaceous shale. In some localities the lower shales or brownish clays are very largely developed and accompanied by soft coarse brownish sandstone containing *nummulites*.

The upper beds of the limestone are generally of light colour, very compact, and crowded with *alveolina*, *nummulites*, *pelecypoda*, *gastropoda*, &c.

Next above and reposing with apparent complete conformity upon these limestones are greyish and purple sandstone and bright red clays of the Murree type. The very lowest beds of these sometimes contain numerous fragmentary reptilian bones and

teeth, silicious fossil trees (of exogenous aspect outwardly, though the parallel fibrous structure has an endogenous look, showing no rings of growth) and more rarely obscure casts of large convex strongly-ribbed bivalve shells. These beds pass upwards by rapid alternation into grey or greenish sandstones and red clays, the latter becoming drab or orange above; and then strings of pebbles and thick bands of crystalline pebble conglomerates or boulder beds close the tertiary series so far as it is known.*

Along the northern side of the Potwár Plateau the tertiary sandstones are identical in aspect with the lower part of those in the Kohát Salt District. They contain gypseous shales, a zone of white gypsum, beds of nummulitic limestone marl and shale, petroleum and sulphur springs, and a few of weak brine, the only trace perhaps of the salt which occurs Trans-Indus. The rocks are in short of the Murree and Subáthu type; and probably representative of the whole nummulitic limestone, together with a considerable portion of the overlying beds exposed along the Salt Range.

The Chita Pahár Range, and its extensions to the east and west from Mochpura to Kohát, exposes nummulitic limestones and shales of a very different character from those we have referred to the Subáthu group. The limestones are dark or black, and the shales brownish olive, forming together the group elsewhere indicated as the Hill Nummulitic Rocks. They are of great thickness, intensely contorted, and are divided from the flanking mass of tertiary deposits by an abnormal line of discordant junction, in most respects strongly resembling a great zone of faulted displacement. Nummulitic beds of the hill

* The peculiar, lofty and remarkably castellated-looking, rocks, shown on maps as a fort (!) called "Kaffir Kote" west of Bahádúr Kheyl, are formed of these beds.

series occur again in the Mirkulán Mountains south of the Pesháwar Plain.

In these mountains there are also strong contorted limestones which may be triassic, but contain little fossil evidence as to their age. Close to Kohát a thin band of ferruginous sandy limestone, just below the nummulitic limestone on the south side of the Afrídí Mountains, contains some fossils recognised as cretaceous by Dr. Waagen of the Geological Survey; while along the northern and eastern parts of these ranges there is a considerable extension of the Attok slates; the slates appear again at the other side of the Pesháwar Valley at the foot of the mountains in the neighbourhood of Hotí Murdán; and the Khaibar Hills seem to be composed of these and other old rocks, perhaps crystalline or schistose; the only evidence we have from this quarter as to age being a record of some lower silurian fossils found by Dr. Falconer in the bed of the Kábal river (see Papers by Captain Godwin-Austen in the *Quarterly Journal, Geological Society*, London, Vol. XXII).

Along the southern face of the hill-limestone ranges older rocks than the nummulitic are exposed, also consisting of dark-coloured limestone, but in places locally associated with black shales identified by their *Ammonites*, *Belemnites*, &c., with the Spiti shales (jurassic) of the Central Himalaya. These Spiti shales occur near Khairá Gallí, Mountain Artillery post, north of Murree. In other parts of these hills the limestones below the hill-nummulitic series contain also *Ammonites*, *Belemnites*, and *Trigoniæ*, proving them to be of jurassic age.

The spurs from the Hazára Mountains, north of the range just now spoken of and east of the Hassan-Abdál and Hurripúr plains, consist largely of triassic limestones containing, so far as hitherto discovered, no very large assemblage of fossil remains, yet sufficient to enable Dr. Waagen to pronounce

an opinion on their general age. The mountain of Sír Ban over Abbottábád presents an epitome of the geology of this country, from the nummulitic rocks downwards (see *Memoirs Geological Survey*, Vol. IX, part 2), and is interesting in containing more ample evidence of the cretaceous age of a certain zone there seen, than had previously been found. The presence of the Spiti shale (jurassic), and of rather more fossiliferous beds in the Trias than usual, is also interesting; nearly all sections on the mountain sides being highly instructive.

From Abbottábád to Mánsera, the Hazára Hills are chiefly formed of slates similar to those of Mián-jáni Mountain, Attok, and the Gándghar Ridge. In the latter, the slates alternate with considerable quantities of limestone, which has not as yet yielded any organisms; and small bands of basic trap occur. This slate and limestone series extends westward by south to Attok, where these are almost the only rocks seen, and from which place it has been named. Here it is crossed by the Indus, and is found again beyond that river as far as the British boundary near Mír Kulán Pass.

The lower portions of this slaty series in Hazára is sometimes slightly metamorphosed, and becomes talcose on the Kashmir road from Mánsera to Ghari. Near Mánsera, too, its base is seen. Thence to Ughi, under the Black Mountain, granitoid rocks and trap dykes, metamorphic, crystalline or syenitic rocks, only are known to exist. From the look of the high mountains of Yusafzai, &c., beyond the frontier, north of the Pesháwar Valley, they seem also to be formed of similar crystalline and metamorphic rocks.

V.—THE SULIMÁN.

The small ranges trending south-westwards from Káfir-Kôt (on Indus) to Sheik Budín, of which mention has been already made, occupy part of the doubtful ground between the systems of the Salt Range and of the Sulimán.* Of the latter hills scarcely any lie within the border of the Punjab, and we know very little of them in this position.

One reliable section has quite recently been obtained by Mr. Ball, of the Geological Survey, on a trip to examine reported outcrops of coal, some fifty miles beyond the British frontier due west of Dera Ghazi Khan. The diluvial deposits, consisting of conglomerates and sands, reach here close up to the base of the Sulimán range, where they are quite 600 feet in thickness. They have a strong slope of deposition towards the plains, but are at present cut off from the range, as well as from the actual surface deposits of the plains. The main outer range, forming the chain of the Sulimán proper, has an anticlinal structure. Immediately under and inside the diluvial deposits, there is here only a narrow outcrop of red clays and sandstones, corresponding probably with the Dagshai, or Murree, zone (lower tertiary) of the sections already described. They have a high easterly underlie,

* They are mentioned in a manuscript paper by Dr. A. Verchere ("On the geological formations of the hills in the district of Bunnoo and its neighbourhood") to contain miocene, coral rag, fossiliferous Oxfordian, triassic, and highly fossiliferous, carboniferous rocks. As, however, the author confounds the trias with the salt and gypseous series, some doubt may be felt as to the existence of other groups, excepting the tertiary sandstones, clays, &c., the jurassic and carboniferous groups which are recorded by Fleming in the eastern scarp of the Lowághar Mountains.

In the same paper the low hills west of Bannú are stated to be all of miocene (middle tertiary) rocks, and in Wazíristan the plateau of Makeen (Mákin) and Rusmuk, on the Sulimán flanks, are said to be of nummulitic limestone, shale and ferruginous clay, shale (furnishing the Waziri iron ore) overlying gypseous shales, and gypsum with bi-pyramidal quartz crystals (which also occur at Kalabágh on the Indus).

Besides these, triassic, jurassic, and miocene rocks are said to occur in other parts of the country beyond the frontier; but the heights of Pirghall (11,588 feet) and Sheweydur (10,598 feet) are described as formed of volcanic rocks. A. B. W.

and are succeeded conformably by the nummulitic limestone. This rock, too, in its purer state, forms only narrow ridges on the flanks of the range, passing down by alternation into sandy and earthy strata. Rocks of this description rise steeply to the crest of the range, which has an elevation of 7,460 feet at Ek Bhai, the nearest peak to the line of section. The western declivities of the range are formed of the same strata on the reverse dip, which brings in the limestone again to west of the upland valley at this base of the Sulimán. This rock here is much thicker than at the margin of the mountain region, and occupies a broad band of country, in rugged ridges exhibiting much contortion, being in the hollow of a main synclinal fold. To the west of these limestone hills, in the Chamarlang valley, the underlying rocks rise again with the small discontinuous layers of coal, occurring in a horizon about 800 feet below the base of the limestone, apparently within the range of the nummulitic series, and probably representing the similar coal of the Salt Range. Thus in this entire section, reaching far into the mountain region to the west of the Sulimán, no rock was seen that could be identified as older than the nummulitic formation. No eruptive rock was observed.

The only clue to what other formations may be found in this region lies in our knowledge of adjoining sections, in which the rocks are trending towards the Sulimán. We have already noticed these features on the north; and we can best indicate the nature of the ground to the south by extracting a paragraph from Mr. W. T. Blanford's *Sketch of the Geology of Sind*. "At Ránikót, a gorge in the Eri Hills, 20 miles west of the Indus at Magendan, and 45 miles north-west of Kotri, about 1,000 feet of massive *alveolina* limestone [nummulitic] rests on 1,300 feet of variegated sands and clays, at the base of which trap is seen. Whether this trap be intru-

“sive or not, has not been ascertained; it appears
 “stratified and is slightly amygdaloidal. Of course,
 “the occurrence of igneous rocks below the lowest of
 “the rocks known to be associated with the nummu-
 “litic limestones recalls the similar association of varie-
 “gated clays resting upon traps (these unmistakeably
 “belonging to the Deccan series) in Kachh; but it has
 “by no means been definitely ascertained whether the
 “trap in Sind is a representative of the Deccan series.
 “The Eri Hills are an outer ridge of the Hálá Range,
 “and terminate to the north at Sewan. The Hálá
 “Range, stretching along the frontier, is said to be
 “entirely composed of limestone. Further to the
 “north, and to the north-west of Sewan, conglome-
 “rates and sandstones of Siválik age, with mammalian
 “bones, are found along the flanks of the main lime-
 “stone ranges. The greater part of Upper Sind is an
 “alluvial plain.”

VI.—THE ARÁVÁLI REGION.

Very little, indeed, is known of the rocks belong-
 ing to the area that may be structurally assigned to
 the Aráváli system; they are all believed to belong to
 what would, by old writers, have been called primary
 and transition rocks, and are hence presumably diffi-
 cult of arrangement. The general direction of the
 range is to north 40° east; and the geographical
 extent of this geological region is pretty well defined.
 On the south-east, there is a very regular feature run-
 ning south-westwards, from close to Agra to south of
 Nimach, formed more or less continuously by scarps
 of Vindhyan sandstones; beyond this the same bound-
 ary is continued by the western scarp of the Málwa
 plateau, formed of the Deccan trap. This is the
 south-eastern limit of the Aráváli rock system. Along
 a narrow margin the Vindhyan strata are affected by

faults and flexures parallel to the Aráváli system, but probably due to reflex action, unconnected with the original formation of those mountains at the base of which the Vindhyan deposits were probably laid down. The scarp of the Deccan trap is purely a feature of denudation; this rock having once extended across the whole of Guzerat, into Kachh, where it is seen in force underlying the nummulitic formation.

On the west, the outliers of the Aráváli are gradually smothered in the alluvial deposits of the Indus basin, which are fast becoming deeply covered with the wind-borne deposits of that desert region. In the far north-west, between the Chenáb and the Jhilam, about 25 miles south-by-east from Sháhpur, there is a small group of hills which can best be considered as an outlier of the Aráváli rock system. Dr. Fleming has described these Korána Hills: the principal elevation is about 950; the rock is coarse brown, ferruginous, quartzose sandstone, alternating with beds of greenish quartzite passing into silicious clay-slate. The sandstone is traversed by veins of white quartz, containing masses of rich hæmatitic iron ore and small quantities of peroxide of manganese.

In the south-west, in Katyawár and Guzerát, the Aráváli system seems to be principally represented by gneissose rocks; and the same prevail to a great extent in Meywár. But more to the north, in Jeypur and Alwar, semi-metamorphic rocks are the most conspicuous—quartzites, slates, schists, and crystalline limestone, with only occasional out-crops of the gneissic rocks. The detached ridges stretching into the Punjab, in the districts of Delhi, Gurgaon, and Hissár, are the extreme prolongations of the Aráváli ranges. Some of these rocks are supposed to be equivalent to the Gwalior group—which has taken an approximate position in the scale of Indian formations, as intervening between the Lower Vindhyan (Sôn Valley and Karnúl)—and the Bijáwar series. Some obscure

and complicated characters of metamorphic conditions are exhibited in these rocks at Kaliána, the locality of the flexible sandstone, which appears to be only a very local form of decomposition of coarse earthy quartzite.

The coincidence of the prolongation of the Aráváli axis with the many changes noticed in the rock features of the Himalaya in the region of the transverse gorge of the Satlej, suggests a possible connection—an influence of the older Aráváli chain upon the configuration of the younger system.



6
Robertson, John.

THE
IMPERIAL ASSEMBLAGE
DIRECTORY.

E.T. 31.1'32.





PREFACE.

A FORTNIGHT ago the Compilers had no intention of preparing a work of this nature ; the idea originated from the numerous inquiries made to them in regard to the residence in camp of officers and others.

Owing to the short time available for the collection of details, the task of compilation has not been an easy one ; the officers in charge of the several camps were, in most cases, not prepared with information as to who were to occupy tents during the Imperial Assemblage,—indeed, several camps had no representative at Delhi until the second week in December,—and to crown the troubles of the Compilers, there was no local Press capable of printing the Directory.

These difficulties have been overcome ; much information has been collected ; and it is hoped the Directory may be found useful. Should mistakes have crept in, the Compilers will be glad to have them pointed out in view to correction.

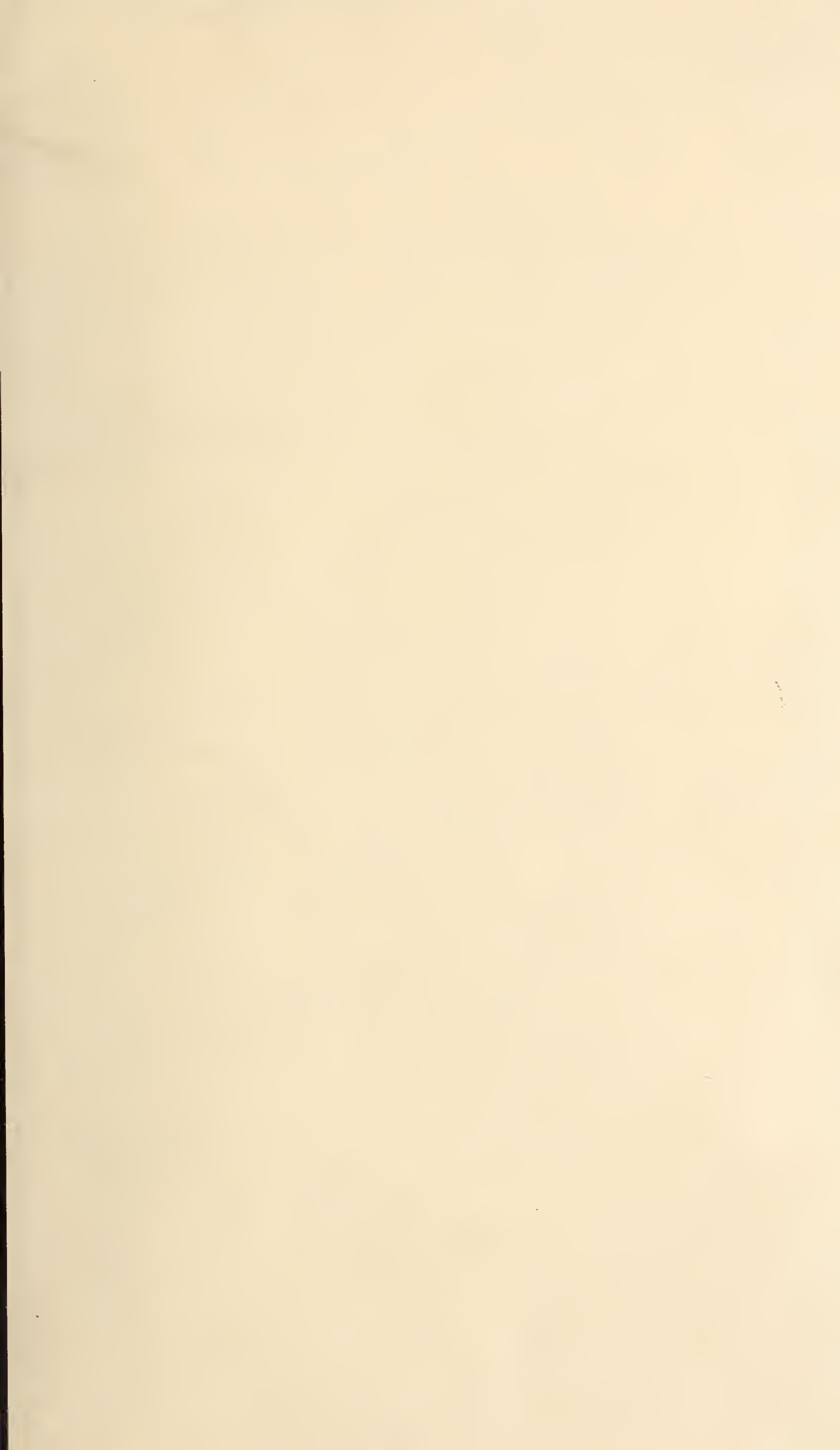
The Map requires no apology ; it has with kind permission been reduced from the official map published by the Quartermaster-General's Department.

No attempt has been made to arrange names or camps in order of precedence.

The Compilers take this opportunity to thank those officers who have helped them with information ; they are especially grateful to Major-General Fred. Roberts, C.B., V.C., Quartermaster-General in India, who has taken the most active interest in their work.

ARMY HEAD-QUARTERS CAMP :
Delhi, the 14th December 1876. }





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SITUATION OF CAMPS.

THE Imperial Camps in the Old Cantonments ; the Viceroy's, facing the Flag Staff Tower ; and the others, to the right and left of it.

The Troops—the Infantry and Viceroy's Escort—on either side of the Alipur Road, west of the Escape Canal, and extending to Mubarik Bagh.

The Cavalry and Artillery, on the Kurnal Road near Bodli-ki-Serai.

The Central India Chiefs, on the Alipur and Kurnal Roads, near the village of Azadpur.

Miscellaneous Camps : the situation of each is given in its own list.

Special Camps : the Gaekwar is close to the Old Magazine in Cantonments ; the Mysore Rajah is south of the above camp ; the Nizam is in Sir T. Metcalf's house, and four other new buildings on this estate.

The Khan of Khelat	}	West of Hindoo Rao's House and east of Mulabagunj.
The Deputation from Siam		
„ „ Nepal		
„ „ Muscat		

The Bombay Chiefs	}	About one and quarter mile west of the City, beyond the Suburbs.
The N.-W. Provinces „		
The Central Provinces „		

The Punjab Chiefs, on the west and south glacis of the City.

The Rajputana Chiefs, on either side of the Gurgaon Road, between the first and second milestones from the City.

The Oudh Talookdars, on the Kootub Road between the third and fourth milestones.

The Chiefs and Native Gentlemen from Bengal, north of the Old Cantonment near the village of Wazeerabad.

The Madras Chiefs and Nobles, on the Kurnal road, near the third milestone from the City.

HIS EXCELLENCY THE VICEROY'S CAMP.

No. 1.—IMPERIAL.

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Governor General of India.

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4. Viscount BROOKE.
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CAMP OF THE LIEUTENANT-GOVERNOR OF THE PUNJAB.

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3. Capt. and Mrs. G. de C. Morton.		3. Maj.-Genl. R. G. Taylor, C.B., C.S.I.
4. Col. and Mrs. Stansfeld.		4. Col. and Mrs. H. N. Miller.
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7. Mr. & Mrs. R. E. Egerton.		7. Col. and Mrs. J. E. Croft.
8. Bgdr.-Genl. C. P. Keyes, C.B., and Mrs. Keyes.		8. Dr. and Mrs. Morice.
9. Mrs. Colquhoun Grant.		9. Mr. Edward Prinsep.
10. Kunwar and Kunwari Harnam Singh.		
5½. Capt. J. C. Cautley.	—	3½. Capt. and Mrs. E. Newbery.
6½. Mr. Cumberlege.		4½. Dr. and Mrs. Taylor.
		5½. Mr. Goldney.

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No. 7.—IMPERIAL.

His Excellency General Sir FREDERICK PAUL HAINES,
K.C.B., Commander-in-Chief in India.

His Excellency Lieut.-Genl. Sir Neville Bowles Chamberlain, G.C.B., G.C.S.I., Commander-in-Chief of the Madras Army—(unable to attend, represented by Bgdr.-Genl. R. C. Stewart, C.B., Adjt.-Genl, Madras Army.)

His Excellency Lieut.-Genl. Sir Charles William Dunbar Staveley, K.C.B., Commander-in-Chief of the Bombay Army, and Lady Staveley.

CAMP OF THEIR EXCELLENCIES THE Cs.-IN-C.—(*Contd.*)

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2. Maj.-Genl. Fred. Roberts, C.B., V.C., and Mrs. Roberts, Miss Ommaney, Miss Maisey ; Col. LeGeyt Bruce, R.H.A.		2. „ H. Moore.
3. Lieut.-Col. M. Heathcote and Col. F. C. Maisey.		3. Col. C. G. and Mrs. Arbuthnot.
4. Lieut.-Col. H. F. Brooke.		4. Col. G. C. and Mrs. Hatch.
5. Col. and Mrs. W. Gordon and Miss Stewart.		5. Surg.-Genl. J. H. Innes, C.B., and Mrs. Innes.
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7. Maj. H. Collett, and Maj. and Mrs. Robertson.		7.
8. Maj. H. Thompson, and Col. and Mrs. Eteson.		8.
9.		9.
10.		10.
11. Dy. Surg.-Genl. J. T. C. Ross.		11. Maj.-Genl., Mrs. and Miss Maude.
12. Lieut.-Col. and Mrs. W. Howey.		12. Col. and Miss Sibley.
13. Capt. the Hon. J. S. and Mrs. Napier.		13. Maj. C. and Mrs. Case.

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2. Capt. H. G. Grant, aide-de-camp.		{ C. Arbuthnot, Esq.
3. Capt. H. B. MacCall, aide-de-camp.		2. { Col. Wilson.
4. Capt. H. Gough, aide-de-camp.		3. Hony. Maj. Shaik Hedayut Alli, Khan Bahadur, Sirdar Bahadur.

CAMP OF THEIR EXCELLENCIES THE C.-IN-C.—(Contd.)

Right. IN LINE WITH H. E. THE C.-IN-C. Left.

- | | |
|--------------------------------|--|
| 5. Lieut. Gough, aide-de-camp. | 4. Nawab Gholam Hossan Khan Alazaie, Khan Bahadoor, C.S.I. |
| 6. Maj. Kerr, aide-de-camp. | 5. Ressaldar-Maj. Man Sing, Sirdar Bahadoor. |
| 7. Lieut. Grant, aide-de-camp. | 6. Subadar-Maj. Inderbeer Lamah, Sirdar Bahadoor. |
| | 7. Subadar-Major Nutha Sing, Sirdar Bahadoor. |
| | 8. Ressaldar-Maj. Mirza Attaoolla Khan, Sirdar Bahadoor. |
| | 9. Subadar-Maj Bussawun Sing, Bahadoor. |
| | 10. Subadar-Maj. Dabeedeen Misser, Sirdar Bahadoor. |

IN REAR OF THE TENTS OF

His Excellency the Commander-in-Chief, Madras Army.

- 1.
2. Lieut. R. C. Wilson.
3. „ G. E. Money.
4. Capt. W. Biscoe.
- 5.
- 6.

His Excellency the Commander-in-Chief, Bombay Army.

1. Brig.-Genl. C. T. Aitchison.
2. „ G. R. S. and Mrs. Burrows.
3. Maj. W. C. Justice.
4. „ G. A. Furse.
5. Capt. W. W. Chard.
6. Subadar Shaik Ebrahim.

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Office of Dy. Adjutant-General Royal Artillery in India.

- Mr. D. Cordwell.

CAMP OF THEIR EXCELLENCIES THE Cs.-IN-C.—(*Concl'd.*)

Right.	REAR OF CENTRE STREET.	Left.
Office of Quarter-Master-General in India.		Office of Judge Advocate-Genl.
Capt. J. Robertson.		Mr. B. E. French.
Mr. L. A. Smith.		Office of Surg.-Genl. H. M.'s British Forces.
Sub-Cond. R. J. Dickson.		Mr. Apothy. T. Hill.
„ G. Pinkston.		

Army Hd.-Qrs. Dispensary.

Mr. Apothy. H. B. Blaker.

CAMP OF THE CHIEF COMMISSIONER OF OUDH.

No. 8.—IMPERIAL.

The Hon. JOHN INGLIS, C.S.I., *Offg. Chief Commissioner,*
Oudh ; Mrs. INGLIS ; Mr. and Mrs. GEORGE INGLIS.

Right.	CENTRE STREET.	Left.
1. Bishop Andrew.		1. Rev. Mr. and Mrs. For- dyce.
2. Rev. D. Rose.		2. Mr. and Mrs. Harington.
3. Hon. J. Bullen Smith, C.S.I.		3. H. J. Sparks, Esq.
4. } Charles Currie, Esq.		4. Dining Tent.
5. }		5. } Col. Barrow.
6. }		6. }
7. } Capt. and Mrs. Erskine.		7. Dr. and Mrs. Amesbury.

CAMP OF THE CHIEF COMMISSIONER OF THE CENTRAL PROVINCES.

No. 9.—IMPERIAL.

JOHN HENRY MORRIS, Esq., *Chief Commissioner of the Central Provinces*; Mrs. MORRIS.

Right.	CENTRE STREET.	Left.
1. Mr. and Lady Ida Low.		1. Dr. S. C., Mrs. and Miss Townsend.
2. C. E. Bernard, Esq., C.S.		2. Col. and Mrs. Mackenzie.
3. W. B. Jones, Esq., C.S.		3. C. Grant, Esq., C.S.
4. J. W. Neill, Esq., C.S.		4. Capt. M. M. Bowie.
5. F. C. Anderson, Esq., C.S.		5. „ H. H. N. Hallett.
6. Lieut. C. F. Call, R.E.		6. C. H. Morris, Esq.

CAMP OF THE CHIEF COMMISSIONER OF BURMAH.

No. 10.—IMPERIAL.

A. RIVERS THOMPSON, Esq., C.S., *Officiating Chief Commissioner and Agent to Governor General for Burmah.*

Right.	CENTRE STREET.	Left.
1. A. Rivers Thompson, Esq., C.S.		1. Mess Tent.
2. Miss Barnes.		2. J. W. Quinton, Esq., C.S.
3. Col. W. S. Trevor.		3. Col. R. D. Ardagh.
4. Maj. C. W. Street.		4. Lieut.-Col. E. B. Sladen.
5. } Capt. and Mrs. H. Boi-		5. Maj. T. Lowndes.
6. } leau.		6. Office.

CAMP OF THE CHIEF COMMISSIONER OF ASSAM.

No. 11.—IMPERIAL.

Colonel R. H. KEATINGE, C.S.I., V.C., *Chief Commissioner.*

Right.

Mr. and Mrs. W. E. Ward.

„ „ Ridsdale.

Maj. S. T. Trevor, R. E.

Capt. F. Trotter.

Left.

Dr. J. O'Brien.

Mr. A. Stewart.

Capt. W. J. Williamson.

Three Cossiah Chiefs.

CAMP OF THE CHIEF COMMISSIONER OF MYSORE.

No. 12.—IMPERIAL.

C. B. SAUNDERS, Esq., C.B., *Chief Commissioner of Mysore and Coorg.*

1. Chief Commissioner.

2. Capt. and Mrs. Wilson.

3. Col. Newton.

4. Dr. Henderson, M.D.

5. Lieut. Owen.

6. Col. Bruce, R.H.A.

CAMP OF THE RESIDENT AT HYDERABAD.

No. 13.—IMPERIAL.

Colonel Sir R. J. MEADE, K.C.S.I., *Resident at Hyderabad, Deccan*; Lady MEADE.

Right.

CENTRE STREET.

Left.

1. Capt. G. H. Trevor.

2. Col. A. D. Clay.

3. Dr. J. Law.

4. „ R. Moyberry.

1. Col. W. Nembhard.

2. Mrs. Nembhard.

3. Col. F. Alexander.

4. Mr. S. D'Costa.

CAMP OF AGENT TO GOVERNOR GENERAL FOR CENTRAL
INDIA.

No. 14.—IMPERIAL.

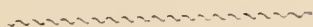
Major-General Sir H. DALY, K.C.B., *Agent to
Governor General for Central India.*

Right.

Maj.-Genl. Sir S. J. Browne,
K.C.S.I., C.B., V.C., and
Lady Browne.
Col. A. Cadell, R.E. and Mrs.
Cadell.
Col. A. R. and Miss Hut-
chinson and Miss Becher.
Dr. J. P. Stratton, M.D.
Maj. and Mrs. P. W. Ban-
nerman.
Lieut.-Col. W. Kincaid.
Surg. T. Beaumont, M.D.
Dr. D. E. Keegan, M.D.
Capt. and Mrs. R. G. E.
Dalrymple.
Lieut. T. Hope.
Capt. A. H. S. Neill.
Lieut. E. D. H. Daly.

Left.

Maj.-Genl. G.S. Montgomery,
C.S.I., Mrs. and Miss
Montgomery.
Col. J. Watson, C.B., V.C.
„ H. Forbes.
Lieut.-Col. and Mrs. B. H.
Blundell.
Lieut.-Col. W. C. Lester.
Maj. and Mrs. E. Temple.
Capt. and Mrs. W. K. Barr.
Dr. and Mrs. Goldsmith.
Lieut. P. J. Durand.
Lieut. C. W. Ravenshaw.
Sahibzada Mahomed Wahid-
u-din.



CAMP OF AGENT TO GOVERNOR-GENERAL FOR RAJPOOTANA.

No. 15.—IMPERIAL.

Colonel Sir LEWIS PELLY, K.C.S.I., *Agent to Governor General.*Major C. K. M. WALTER, *Officiating ditto.*

Right.	CENTRE STREET.	Left.
1. Capt. E. A. Fraser.		1. Lieut. A. P. Thornton.
2. Mr. C. E. Yate.		2. Noor Mahomed Khan.
3. Maj. and Mrs. E. C. Impey.		3. Maj. T. Cadell, V.C.
4. Dr. and Mrs. Burr.		4. Dr. B. and Mrs. Pullen.
5. Maj. and Mrs. T. Dennehy.		5. Lieut.-Col. J. C. Berkeley.
6. Capt. and Mrs. N. C. Martelli.		6. W. H. Smith, Esq., C.S.
7. Rajpootana Officers' Mess.		7. Capt. J. W. Ridgeway.
8. Capt. C. A. Baylay.		8. Dr. Spencer.
9. „ and Mrs. J. Jacob.		9. Capt. & Mrs. O. B. C. St. John.
10. Dr. Hendley.		10. Dr. Newman.
<hr/>		
1½. Dr. Moore.		1½. Mr. H. M. Durand, C.S.
2½. Mr. Leslie Saunders, C.S., and Mrs. Saunders.		2½. Capt. J. H. L. Greenfield.
3½. Col. H. L. Campbell.		3½. Lieut.-Col. T. E. Gordon, C.S.I.
4½. Mr. J. Miles, C.E.		4½. Lieut.-Col. C. H. Clay.
		5½. Dr. De Fabeck.
		6½. Mr. J. Laing.
		7½. Maj. Law.



CAMP OF AGENT TO GOVERNOR GENERAL FOR BARODA.

No. 16.—IMPERIAL.

PHILIP SANDYS MELVILL, Esq., C.S.I., *Agent to the
Governor General at Baroda.*

Mrs. and Miss MELVILL.
„ JOUBERT.

Mrs. WARBURTON.
Mr. R. D'CRUZ.



ARTILLERY DIVISION.

CAMP No. 1.—TROOPS.

F. Battery F. Brigade Royal Horse Artillery.

Lieut.-Col. and Mrs. David MacFarlan.	Lieut. J. F. Harman.
Lieut. J. D. Snodgrass.	„ and Mrs. E. R. Ellis.
	Surg.-Maj. Symonds.

B. Battery 8th Brigade Royal Artillery.

Maj. and Mrs. A. Dixon.	Lieut. P. F. P. Hamilton.
Capt. Martelli.	„ E. G. Edwards.
Lieut. R. A. C. King.	Surg.-Maj. J. Wilson, M.B.

D. Battery 8th Brigade Royal Artillery.

Maj. and Mrs. F. E. Hadow.	Lieut. A. C. Hansard.
Capt. E. W. Nash.	Surg. E. A. Mapleton.
Lieut. R. Oakes.	

F. Battery 8th Brigade Royal Artillery.

Maj. D. S. Pemberton.	Lieut. E. A. Smith.
Lieut. H. B. Jeffreys.	Surg.-Maj. J. H. White, M.D.
„ W. D. Garnett-Botfield.	Vety. Surg. J. A. Woods.

G. Battery 11th Brigade Royal Artillery.

Maj. Sir J. W. Campbell, R.A., Bart.	Lieut. W. P. Thring, R.A.
Capt. G. Keith, R.A.	Surg. W. Keir, M.D.
Lieut. A.H. Whitehouse, R.A.	Vety. Surg. and Mrs. C. Clayton.

ARTILLERY DIVISION.—(*Contd.*)

A. Battery 19th Brigade Royal Artillery.

Maj. A. H. Davidson, comdg.	Lieut. H. Curtis.
Lieut. H. A. Scott.	Surg.-Maj. and Mrs. Colan.
„ H. G. Weir.	Vety. Surg. Crawford.

No. 7 Battery 21st Brigade Royal Artillery.

Maj. W. W. Woodward.	Lieut. H. L. Lyster.
Capt. H. Roberts.	Surg.-Maj. Paxton, M.D., and
Lieut. H. T. Lugard.	Mrs. Paxton.

ARTILLERY DIVISION—HEAD-QUARTERS.

CAMP No. 2.—TROOPS.

Col. (and Mrs.) C. R. O. Evans, commanding.
Maj. (and Mrs.) C. E. Nairne, assistant adjutant-general.
Capt. (and Mrs.) Rivett-Carnac, assistant quartermaster-general.
Lieut. C. G. Osborne, deputy assistant quartermaster-general.
Col. (and Mrs.) J.E. Michell, C.B., commanding royal horse artillery.
„ W. J. Gray, commanding field artillery.
Capt. F. R. Gambier, brigade-major.
Surg.-Maj. E. Y. Kellett, principal medical officer.
Col. H. A. Taylor, exe. commst. officer, Misses Taylor and Wiles.
Lieut. E. C. C. Sandys, deputy assistant commissary-general.
Capt. S. Gardiner, R.A.
Lieut. Lloyd, aide-de-camp.
„ E. G. Osborne, deputy assistant quartermaster-general.

CAVALRY DIVISION.

CAMP No. 3.—TROOPS

1st Brigade.

Head-Quarters.

Col. C. H. Palliser, C.B., 10th B. L., commanding.

Capt. H. R. Abadie, 9th Lancers, brigade-major.

10th (Prince of Wales' Own Royal) Hussars.

Lieut.-Col. Lord R. D. Kerr,
commanding.

Capt. T. A. Quintin.

„ B. A. Combe.

Lieut. the Hon. C. C. W.
Cavendish, adjutant.

Lieut. the Hon. J. P. Napier.

„ F. W. Montresor.

„ J. P. Brabazon.

„ R. Tuite-Dalton.

Lieut. W. E. Phillips.

„ P. F. Durham.

„ R. H. F. W. Wilson.

Sub-Lt. R. B. W. Fisher.

„ E. M. L. Inman.

Riding-Mr. C. Sandes.

Qr.-Mr. W. King.

Surg.-Maj. W. Cattell.

Surg. H. Cornish.

„ E. A. H. Rose.

Vety. Surg. W. Appleton.

4th Bengal Cavalry.

Col. and Mrs. G. C. Hankin.

Maj. and Mrs. M. M. Pender-
gast.

Maj. E. H. C. Simpson.

„ F. P. W. Freeman.

Capt. and Mrs. D. Adamson.

„ C. E. Harenc.

Lieut. H. C. Lamb.

Surg. J. L. Corbett, M.D.

2nd Brigade.

Head-Quarters.

Col. J. C. Graves, C.B., 3rd Bombay L. C., commanding.

Capt. G. Luck, 15th Hussars, brigade-major.

CAVALRY DIVISION.—(*Contd.*)

3rd Madras Cavalry.

Col. G. R. Phillips, comdg.	Bt.-Maj. T. H. T. Chalon.
„ G. H. M. Aynsley.	Lieut. W. H. McCausland.
Lieut.-Col. F. Horsley.	Surg. D. F. Bateman.
Bt.-Maj. H. C. Stevens.	

3rd Punjab Cavalry.

Col. and Mrs. L. B. Jones (ex- pected from England.)	Capt. J. D. Macpherson.
Maj. and Mrs. A. Vivian.	Lieut. C. C. Egerton.
Capt. W. C. Anderson.	„ F. Mardall.
	Surg.-Maj. and Mrs. Costello.

3rd Brigade.

Head-Quarters.

Lieut.-Col. A. L. Annesley, 11th Hussars, commanding.
——— brigade-major.

15th Hussars.

Lt.-Col. J. E. Swindley.	Lieut. R. G. S. Crawford.
Maj. F. H. Gregory.	„ H. L. Daly.
Capt. and Mrs. G. Luck.	Sub-Lt. G. F. Gavin.
„ W. White.	„ P. C. Reid.
„ H. Hall.	„ the Hon. R. Leigh.
„ J. B. S. Bullen.	„ „ A. Manners.
„ E. D. F. Sullivan.	Pay-Mr. R. Sheehy.
Lieut. A. Smirke.	Riding-Mr. D. N. Smith.
„ A. T. Middleton, adjt.	Surg.-Maj. & Mrs. J. Warren.
„ E. A. Webbe.	Surg. P. J. McQuaid.
	Vety. Surg. W. Gillard.

CAVALRY DIVISION.—(*Contd.*)

10th Bengal Lancers.

Maj. O. Barnes (special duty.)	Capt. H. O. Greenaway.
Capt. A. England, offg. comdt.	Lieut. A. Burlton Bennet.
„ D. M. Strong.	Surg.-Maj. G. V. Currie.

18th Bengal Cavalry.

Maj. T. R. Davidson.	Capt. E. S. Neave.
„ R. Wheeler.	Lieut. G. L. R. Richardson.
Capt. A. P. Broome.	„ W. H. F. Macmullen.
	Surg. —————

CAMP OF HEAD-QUARTERS OF THE CAVALRY DIVISION.

No 4.—TROOPS.

Maj.-Genl. and Mrs. C. T. Chamberlain, C.S.I., commanding.
Miss Gordon.
Maj. Stanley Clarke, 4th Hussars, assistant adjutant-general.
Capt. R. G. Kennedy, B.S.C., assistant quartermaster-general.
„ H. H. F. Gifford, 13th Hussars, deputy assistant quartermaster-general.
Maj. N. R. Burlton, B.S.C., deputy assistant commissary general.
Surg.-Maj. and Mrs. Williams, M.D., principal medical officer.
Maj. A. Schmidt, assistant adjutant-general, Oudh division.
Col. T. H. Chamberlain, B.S.C.
Lieut. C. J. H. Chamberlain.
Capt. H. S. Higginson, R.A., aide-de-camp.

CAMP OF 1st BRIGADE 1st INFANTRY DIVISION.

No 5.—TROOPS.

Brigade Head-Quarters.

Bgdr.-Genl. M. A. S. Biddulph, C.B , commanding.

Capt. J. H. Tarleton, 54th Foot, brigade-major.

Volunteer Battalion.

Col. B. Walton, commanding.

Maj. and Mrs. F. Stephen, staff officer.

[*For Names of Volunteers, see end of Book.*]

2nd Seikh Infantry.

Maj. & Mrs. Boswell & Miss Hill.	Capt. Hastings.
„ Pratt.	„ Thompson.
Capt. Slater.	Surg. Robinson.

23rd Punjab Pioneers.

Lt.-Col. A. A. Currie, comdg.	Lieut. A. E. Jones.
Capt. A. D. Anderson.	Surg.-Maj. E. Taylor.
„ H. Paterson.	Surg. J. P. Freyor.
„ S. V., Mrs. and Master C. Gordon.	

CAMP OF 2nd BRIGADE 1st INFANTRY DIVISION.

No. 6.—TROOPS.

Brigade Head-Quarters.

Bgdr.-Genl. F. G. Kempster, M.S.C., commanding.

Capt. W. Coningham, M.S.C., brigade-major.

39th Foot.

Lt.-Col. and Mrs. T. F. Dixon,
comdg 39th regt.

Local Maj. and Mrs. J. G.
Smyth.

Capt. O. J. Bradford.

Local Maj. and Mrs. J.
Sharples.

Capt. J. B. Keith.

Lieut. A. G. W. Malet.

„ C. P. Egerton.

„ R. C. A. Beatty, offg.
adjt.

Local Capt. and Mrs. J. C. S.
Irving.

Lieut. H. Chevers.

„ C. S. Cumberland.

„ E. W. Conran.

„ R. B. Rudyerd.

„ S. W. T. Roberts.

„ P. Farrer.

„ H. J. J. Kentish.

Sub-Lieut. F. C. Dunlop.

Pay-Mr. and Mrs. J. G.
Hamilton.

Qr.-Mr. J. Jobberns.

Surg.-Maj. W. Creyk.

Surg. G. C. Purcell.

9th Native Infantry.

Lt.-Col. & Mrs. W. H. Hawes.

Capt. and Mrs. Yoke.

„ „ R. Anstruther-
Price.

Capt. H. L. Young.

Lieut. and Mrs. H. O. Wood-
house.

Surg. and Mrs. A. H. Will-
iams.

Lieut. A. T. Weller.

CAMP OF 2ND BRIGADE 1ST INFANTRY DIVISION.—(*Contd.*)

20th Madras Native Infantry.

Col. Buck, commanding.	Lieut. G. Sharp.
Lieut.-Col. Palmer.	„ J. O. Goldie.
„ Plowden.	„ O. Bradshaw.
Capt. and Mrs. G. Randell.	Surg. Backhouse.



CAMP OF 3rd BRIGADE 1st INFANTRY DIVISION.

No. 7.—TROOPS.

Brigade Head-Quarters.

Bgdr.-Genl. H. T. Macpherson, C.B., V.C., commanding.
Capt. G. C. Gregory, 3rd Goorkhas, brigade-major.

2nd Battalion 60th Royal Rifles.

Lieut.-Col. H. P. Montgomery.	Lieut. F. S. Marsham.
Maj. C. Ashburnham.	„ N. More-Nisbitt.
Local Maj. J. Charley.	„ E. A. Sandford.
Capt. G. H. Trotman.	Sub.-Lieut. Lord F. Fitz-
„ R. Chalmer.	Gerald.
„ W. Tilden.	Sub.-Lieut. R. E. Golightly.
Lieut. W. Forster.	„ A. Davidson.
„ T. P. Lloyd.	Surg.-Maj. F. A. Turton.
„ C. Hope.	Surg. C. Charlesworth.
„ W. S. Anderson.	Qr.-Mr. W. Holmes.

CAMP OF 3RD BRIGADE 1ST INFANTRY DIVISION.—(Contd.)

2nd Goorkhas.

Lieut.-Col. D. Macintyre, V.C., comdg.	Lieut. H. S. Wheatley.
	„ and Mrs. R. C. Hadow.
Capt. A. Battye.	„ A. G. F. Browne.
Lieut. W. P. Newall.	Surg. W. E. Griffith.

3rd Goorkha Regiment.

Col. A. Paterson, comdg.	Capt. & Mrs. R. E. K. Money.
Lieut.-Col. and Mrs. W. A. Garden.	Lieut. C. Pulley.
Capt. G. C. Gregory.	Surg.-Maj. and Mrs. G. M. Govan, M.D.

1st INFANTRY DIVISION—DIVISIONAL HEAD-QUARTERS.

No. 8.—TROOPS.

Maj.-Genl. Sir James Brind, K.C.B., commanding.
Capt. R. B. McEwen, 92nd Highlanders, aide-de-camp.
Maj. W. Galbraith, 85th Foot, assistant adjutant-general.
Capt. T. D. Barrow, 10th Bengal Lancers, assistant adjutant-general.
Capt. (and Mrs.) E. H. Collen, B.S.C., deputy assistant adjutant-general.
Col. S. Chalmers, assistant commissary-general.
Capt. A. F. Langton, M.S.C., deputy assistant commissary-general.
Surg.-Maj. J. Hendley, principal medical officer.

CAMP OF 1st BRIGADE 2nd INFANTRY DIVISION.

No. 9.—TROOPS.

Brigade Head-Quarters.

Brigdr.-Genl. (and Mrs.) H. R. Browne, commanding.

Capt. F. W. Collis, B.S.C., brigade-major.

59th Foot.

Col. and Mrs. J. de Montmo-
rency and Miss J. G. Lillie.

Lieut.-Col. J. S. P. Clarke.

Maj. and Mrs. R S- Shinkwin.

Capt. L. A. Powys.

Capt. and Mrs. D. T. Chisholm.

„ „ E. H. Sartorius.

Lieut. W. P. Lawlor.

„ J. T. A. Drought.

„ J. F. Irwin.

Lieut. A. D. Worgan.

„ M. W. Battye.

„ A. G. Leonard.

„ and Mrs. S. Watson.

Sub-Lt. H. A. B. Boulderson.

„ C. C. Hodgkinson.

Qr.-Mr. J. Rowland.

Surg.-Maj. and Mrs. J. Robin-
son.

Surg. F. S. Young.

28th Native Infantry.

Col. W. C. Hamilton, comdg.,
(guests—Mr. and Mrs.
Walker.)

Capt. G. S. Hills.

„ H. S. Marshall.

„ F. A. S. D'Acosta de
St. Laurent.

Capt. F. R. A. B. Consta-
ble.

Lieut. C. J. Dennys.

„ A. R. Porter.

Surg.-Maj. R. T. Lyons.

„ W. R. Murphy.

CAMP OF 1ST BRIGADE 2ND INFANTRY DIVISION,—(Contd.)

39th Native Infantry.

Maj. F. Gellie, comdg.	Lieut. A. T. Banon.
Capt. H. O. Cumberlege.	Surg. G. Bomford.
„ and Mrs. E. M. Forbes.	

CAMP OF 2nd BRIGADE 2nd INFANTRY DIVISION.

No. 10.—TROOPS.

Brigade Head-Quarters.

Brigdr.-Genl. R. Phayre, C.B., aide-de-camp to the Queen.
Lieut. W. Cooke Collis, 83rd Foot, brigade-major.
Mrs. and two Misses Phayre.
Lieut. T. H. Peckham, 3rd Hussars, orderly officer.

63rd Foot.

Lieut.-Col. R. J. Hughes.	Lieut. G. L. Garstin.
Maj. W. F. Gordon.	„ J. G. Robotham.
Capt. C. E. Terrot.	Sub-Lt. W. Tenison.
„ F. W. Day.	„ A. G. Stubbs.
„ H. M. Parkerson.	Pay-Mr. F. Piper.
„ C. J. Ryan.	Adjut. W. Palmer, lieut.
„ R. W. Bastow.	Qr.-Mr. H. Stokes.
Lieut. W. F. Nuthall.	Surg.-Maj. J. B. Hannah.
„ H. R. Cook.	Surg. Grant.

16th Bombay Native Infantry.

Col. W. L. Cahusac, comdg.	Capt. J. R. Watson.
Lieut.-Col. F. S. Iredell.	Lieut. F. G. T. Welch.
Maj. W. G. Trevor.	„ W. C. Aslett.
Capt. J. T. Carruthers.	Surg. W. C. Kiernander.

CAMP OF 2nd BRIGADE 2nd INFANTRY DIVISION.—(*Contd.*)

24th Bombay Native Infantry.

Col. (Mrs. and Miss) J. H.	Lieut. and Mrs. W. H. Lyster.
Henderson, comdg.	„ „ W. J. Morse.
Col. J. H. S. Pierce.	„ A. A. Pearson.
Maj. J. Barras.	Surg. Lucas.
Capt. Hay.	



CAMP OF 3rd BRIGADE 2nd INFANTRY DIVISION.

—————
No. 11.—TROOPS.
—————

Brigade Head-Quarters.

Brigdr.-Genl. (Mrs. and two Misses) O. E. Rothney, C.S.I.
Maj. Keogh, 12th Foot, brigade-major.

—————
92nd Highlanders.

Maj. G. S. White, comdg.	Lieut. J. S. M. Hamilton.
„ J. C. Hay.	„ St. J. W. Forbes.
Capt. G. K. McCallum.	„ W. A. Scott.
„ H. F. Cotton.	„ E. Gilpin-Brown.
„ P. F. Robertson.	„ W. C. Boyd.
„ & Mrs. A. D. Macgregor.	„ F. F. Ramsay.
„ F. R. Darvall.	Sub.-Lieut. E. C. Bethune.
„ R. H. Oxley.	Maj. and } J. D. Swinburne.
Lieut. D. F. Gordon.	Pay-Mr. }
„ C. H. Douglas.	Qr.-Mr. J. Bignell.
„ S. A. Menzies.	Surg. A. F. Ratigan.
„ W. H. Dick-Cunyngham.	Surg. F. Lyons.

CAMP OF 3rd BRIGADE 2nd INFANTRY DIVISION.—(*Contd.*)

12th Native Infantry.

Col. R. H. Price, comdg.	Lieut. A. F. Barrow, offg.
Lieut.-Col. W. Macdonald.	dy. asst. qr. mr. gl.
Capt. H. S. Anderson.	Capt. A. G. Hartshorne.
„ A. Oldham.	Lieut. J. W. E. Angelo.
	Surg. F. J. Tuohy, M.D.

40th Native Infantry.

Lieut.-Col., Mrs. and Miss	Lieut. H. D. Hutchinson.
E. Dandridge.	Dr., Mrs. and Mr. B. Moynan.
Maj. H. Morton.	Lieut. B. Briscoe.
Capt. J. Fraser.	„ G. Collins.

CAMP OF 2nd INFANTRY DIVISION—HEAD-QUARTERS.

No. 12.—Troops.

Maj.-Genl. the Hon'ble A. E. Hardinge, C.B.
Capt. (and Mrs.) Langtry, aide-de-camp.
„ Bushman, 9th Lancers, extra aide-de-camp.
Lieut.-Col. (Mrs. and Miss) Chester, assistant adjutant-general.
The Rev. J. Adams, chaplain.
Capt. and Mrs. King-Harman.
Lieut. G. D. Stawell, 11th Foot, deputy assistant quartermaster-general.
Capt. (& Mrs.) H. de V. Hunt, sub-assistant commissary-general.
Surg.-Maj. J. A. Hutchinson.
Capt. Turner, assistant adjutant-general, musketry, 3rd circle.
Maj. Saunders, sub-assistant commissary-general, Bombay S. C.

CAMP OF 2nd INFANTRY DIVISION, &c.—(*Contd.*)

Col. (Mrs. and two Misses) C.S. Lane, assistant commissary-general.

—Bailie, Esq., member of council, Bombay.

Col. (and Mrs.) Horne, deputy judge advocate-general.

Maj. (and Mrs.) Newton Barton, 25th N.I.

Capt. (and Mrs.) Steel, 25th N. I.

Miss Banister.

Visitors.

CAMP OF SAPPERS AND MINERS.

No. 13.—TROOPS.

Detachment of four Companies of Sappers and Miners.

Capt. B. Blood, R.E., comdg.	Lieut. M. C. Barton, R.E.
„ W. North, R.E.	„ J. C. Campbell, R.E.
Lieut. L. F. Brown, R.E.	„ the Hon. M. G. Talbot,
„ T. Haslett, R.E.	R.E.
„ E. Blunt, R.E.	Lieut. E. S. E. Childers, R.E.
„ M. N. Hobday, R.E.	„ J. Hare, R.E.
	Surg. S. Borah.

CAMP—No. 14.—TROOPS.

A. Battery C. Brigade Royal Horse Artillery.

Lt.-Col. and Mrs. M. M. Fitzgerald.	Capt. and Mrs. R. E. Mundy.
	Lieut. P. Hussey.
Capt. R. G. S. Marshall.	Surg.-Maj. F. R. Hogg.
„ H. J. O. Walker.	Vety. Surg. J. J. Philips.

CAMP—No. 15.—TROOPS.

11th Hussars.

Lieut.-Col. A. L. Annesley.

Maj. A. P. Garnett.

Capt. R. J. Somers, bt.-maj.

„ E. S. Rivett-Carnac.

„ St. J. S. Taylor.

„ F. de Grissell.

„ J. D. H. Stewart.

Lieut. E. E. Lushington.

„ J. C. Kinchant.

„ C. V. Verelst.

„ L. Thompson, adjt.

Lieut. K. Borrowes.

„ M. A. Close.

„ A. B. Hayley.

„ Lord E. Talbot.

Sub-Lieut. H. D. Willock.

Qr.-Mr. E. Frayling.

Vety. Surg. C. Percival.

Surg.-Maj. A. F. S. Clarke.

„ G. Whitla.

Surg. N. McCreery.

CAMP—No. 16.—TROOPS.

3rd (Queen's Own) Regiment Bombay Light Cavalry.

Maj. C. E. Stack, offg. comdt.

„ A. P. Currie.

Capt. J. F. Willoughby.

„ W. M. Stevens.

Lieut. H. P. Young.

Surg.-Maj. C. J. F. S.

McDowell.

CAMP—No. 17.—TROOPS.

Governor-General's Body Guard.

Bt.-Maj. H. P. Peacock, commanding.

Capt. T. Deane, adjutant.

Body Guard of the Governor of Madras.

Maj. J. M. C. Galloway, commanding.

Lieut. C. H. Simpson, adjutant.

Surg. A. L. Hackett.

CAMP—No. 18.—TROOPS.

1st Battalion 6th Foot.

Lieut.-Col. T. L. Bell, comdg.

Maj. L. B. Hole.

„ and Mrs. W. J. M.
Crawford.

Capt. A. Austin.

„ C. W. H. Wilson.

„ J. B. Hopkins.

„ A. R. A. Collis.

Lieut. A. W. Whitworth.

„ & Mrs. F. L. Grundy.

„ & Mrs. F. Longbourne.

„ E. A. Ball, adjt.

„ R. J. Doyne.

„ E. H. Corse-Scott.

Lieut. E. J. Winnington-
Ingram.

Lieut. St. G. J. Rathborne.

„ T. G. Lumsden.

„ H. L. Ramsay.

„ C. E. Pollock.

„ E. M. Eyre.

Maj. W. Wastell, pay-mr.

Qr.-Mr. G. Beedle.

Surg.-Maj. E. F. O'Leary.

„ and Mrs. H. F.
Patterson.

Surg. R. Exham.

„ B. W. Wellings.

CAMP—No. 19.—TROOPS.

11th Madras Native Infantry.

Lieut.-Col. D. & Mrs. Grant.

Capt. and Mrs. F. J. F. Monro.

Maj. H. G. Symons.

„ C. H. Sheppard.

Capt. C. Curtois.


Surg. C. Harvey.

Head-Quarters of the Escort of His Excellency the Viceroy.

Brigdr.-Genl. R. Hume, C.B., commanding.

Capt. W. R. Hamilton, 4th B. C., brigade-major.

Surg.-Maj. J. Tulloch, principal medical officer.



CAMP POST OFFICES.

THE following are the arrangements for the Imperial Assemblage Camp Post Office :—

There will be in all five Post Offices.

FIELD POST OFFICE.

Postmaster—Mr. H. M. MEHTA.

This office will be located in the Delhi Post Office compound, and will be the head office. Covers intended for regiments and official visitors connected with the Delhi Durbar will be sorted in this office.

GOVERNOR GENERAL'S POST OFFICE.

No. 4.—MISCELLANEOUS.

Located near the Viceroy's Camp.

Postmaster—Mr. E. W. CONSIDINE.

This office will also serve the camps of Governors of Bombay, Madras, Lieutenant-Governors, and Chief Commissioners; also the regiments composing the Governor General's escort.

1st INFANTRY DIVISION POST OFFICE.

No. 3.—MISCELLANEOUS.

Located on the Alipur Road, West of the Escape Canal.

Postmaster—Mr. J. H. SMITH.

2nd INFANTRY DIVISION POST OFFICE.

No. 2.—MISCELLANEOUS.

Located near Mubarik Bagh, on the Alipur Road.

Postmaster—Mr. C. E. CHARDE.

ARTILLERY AND CAVALRY DIVISION POST OFFICE.

No. 1.—MISCELLANEOUS.

Located near Bodli-ki-Serai.

Postmaster—Mr. J. P. GRICE.

The above offices will be branch post offices under the superintendence of Inspector E. Hodgkinson.

Letters for the official visitors and the different Rajahs, Chiefs, and their followers, will be disposed of by the Delhi Post Office.

Postmaster—Mr. D. PHILLIPS.

PUBLIC WORKS AND BARRACK DEPARTMENTS.

Ex. Engr., Mily. Works, Capt. G. T. Maitland.

Asst. Engr., " " " Grant, R.E.

FOR STORES—GODOWNS, &C., IN FORT DELHI.

Barrack-Master Col. M. Orchard, and two Barrack Sergeants.

FOR IMPERIAL CAMPS.

No. 6.—MISCELLANEOUS.

Located East flank of No. 7 Imperial Camp.

Barrack-Master, Lieut. George Blake.

 " Sergeant, W. Warren.

 " " T. Axe.

FOR TROOPS.

No. 5.—MISCELLANEOUS.

Located on the Kurnal Road, close to the 4-milestone from the City.

Barrack-Master, Condr. B. Revell.

„ Sergeant, J. Pope.

„ „ T. Fisher.

IMPERIAL ASSEMBLAGE CAMP BAZAR.

No. 7.—MISCELLANEOUS.

Located in the Sudder Bazar of Old Cantonments.

Capt. V. W. Tregear, in charge of Bazar.

COMMISSARIAT CAMP.

No. 8.—MISCELLANEOUS.

Located near Azadpur Village.

OFFICERS.

Col. J. Keer, prinpl. exe. commst. officer.

Lieut. and Mrs. G. L. Eliot.

Lieut., Mrs. and Miss C. M. Keighly.

SUBORDINATE OFFICERS.

Lieut. C. Owens.

Sergt. Waters.

Condr. Hannon.

„ Charters.

Sub.-Condr. Stevens.

„ Mercer.

„ Sharpe.

CAMP OF GOVERNMENT TELEGRAPH OFFICE.

No. 9.—MISCELLANEOUS.

Situated near Viceroy's Camp.

- | | |
|--------------------------------|---------------------|
| 1. J. A. Breadon, tel. master. | 1. C. E. O'Donnell. |
| 2. G. E. Chalke. | 2. W. A. Curren. |
| 3. T. H. Cotter. | 3. J. M. Hart. |

Field telegraph offices worked by military signallers under the superintendence of the officer commanding the sappers and miners.

OFFICE No. 10.—MISCELLANEOUS.

Situated near Bodli-ki-Serai.

OFFICE No. 11.—MISCELLANEOUS.

Situated near Camp Post Office No. 2.

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## RAILWAY TRAFFIC MANAGEMENT.

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### No. 12.—MISCELLANEOUS.

Located North-East of Viceroy's Camp.

Captain W. A. J. Wallace, deputy consulting engineer to government for guaranteed railways, in charge of special traffic arrangements during the assemblage, from whom all information regarding special trains, &c., can be obtained.

Attached to the above is a telegraphic office working in connection with E. I. railway station in the city.

Major H. Fellowes, deputy assistant quartermaster-general, superintendent of railway transport arrangements.

## ATTACHES' CAMP.

## No. 13.—MISCELLANEOUS.

Located South of Old Cantonments.

| Names.                        | Designation.               |
|-------------------------------|----------------------------|
| 1. Capt. F. H. Maitland,      | Attaché for Central India. |
| 2. „ J. W. Ridgeway,          | „ Rajpootana.              |
| 3. Lieut. Meade,              | „ Hyderabad.               |
| 4. Capt. E. Molloy,           | „ Yarkand Envoy.           |
| 5. „ R. H. Grant,             | „ A. Q. M. General.        |
| 6. Lieut. J. C. F. Gordon,    | „ D. A. Q. M. General.     |
| 7. Baron J. Bentinck,         | „                          |
| 8. T. Cooper, Esq.,           | „                          |
| 9. Col. H. M. Boddam,         | „ Bengal,                  |
| 10. Capt. Mackenzie,          | „ Benares.                 |
| 11. „ A. Murray,              | „ Oudh.                    |
| 12. Maj. H. N. Reeves,        | „ Bombay.                  |
| 13. Col. A. F. F. Bloomfield, | „ Madras.                  |
| 14. Mr. Hiat Khan, C.S.I.,    | „ Punjab.                  |
| 15. ———                       | „ Madras.                  |
| 16. ———                       | „ N.-W. Provinces.         |
| 17. Col. Lowie Smith,         | „ Central Provinces.       |
| 18. Capt. R. G. Mayne,        | „ Baroda.                  |
| 19. ———                       | „ Mysore.                  |
| 20. ———                       | „ Burmah.                  |
| 21. ———                       | „ Assam.                   |
| 22. D. Fitzpatrick, Esq.,     | „ Foreign Office.          |
| 23. F. Daukes, Esq.,          | „ Do.                      |
| 24. Lieut. H. M. Temple,      | „ Do.                      |
| 25. Col. Johnstone,           | „ Do.                      |
| 26. Talboys Wheeler, Esq.,    | „ Do.                      |
| 27. ———Repling, Esq.,         | „                          |
| 28. ———Griffith, Esq.,        | „                          |
| ———Brock, Esq.,               | „                          |

ATTACHES' CAMP.—(*Continued.*)

| Name                     | Designation.                              |
|--------------------------|-------------------------------------------|
| 29. Maj. R. G. Sandeman, | Attaché for Dera Ghazi Khan<br>of Khelat. |
| 30. —————                | „ Do.                                     |
| 31. Capt. Talbot,        | „ Siamese Camp.                           |
| 32. —————                | Vice-Consul for Siam.                     |
| 33. —————                | Attaché for Muscat.                       |
| 34. Dr. Scully.          | „ Nepaul.                                 |

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CONSULS' CAMP.

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No. 14.—MISCELLANEOUS.

Located South of Old Cantonments.

Left.

- I. R. Macallister, Esq., in charge of the office of consul-general for United States of America.
- II. G. Smith, Esq., acting consul for the German Empire.
- III. Chevalier J. Galliam, consul for Italy.
- IV. Evan Cutser, Esq., consul for the Netherlands.
- V. Leo Lander, Esq., consul for Spain.
- VI. Abaunckjee Ruthmajee, Esq., consul for Persia.
- VI. ————— attaché to consul of Persia.

Right.

- I. Mons. Eydin, consul-general for France.
- II. „ Droum, attaché to consul-general for France.
- III. T. O. Hay, Esq., consul-general for Denmark.
- IV. H. F. Brown, Esq., consul for Denmark.
- V. J. Block, Esq., acting consul for Belgium.
- VI. C. B. Forbes, Esq., consul for Siam.
- VI. ————— vice-consul for Siam.

EUROPEAN PRESS CAMP.

No. 15.—MISCELLANEOUS.

CORRESPONDENTS, &C., OF ANGLO-INDIAN NEWSPAPERS.

Located South of Old Cantonments.

Maj. E. R. C. BRADFORD, C.S.I., in charge of Camp.

Friend of India.	The Bombay Gazette.
The Pioneer	The Times of India.
The Statesman.	The Madras Times.
The Indian Daily News.	The Madras Mail.
The Indian Public Opinion.	The Delhi Gazette.
The Englishman.	The Civil & Military Gazette.
Reuter's Agent.	The Himalaya Chronicle.
The Madras Athenæum.	The Graphic of London.

NATIVE PRESS CAMP.

No. 16.—MISCELLANEOUS.

CORRESPONDENTS, &C., OF NATIVE NEWSPAPERS.

Located South of Old Cantonments.

The Hindoo Patriot, Calcutta.	The Oudh Akhbar, Lucknow.
The Indian Mirror, „	The Nur-ul-Absar, Allahabad.
The Sadharani, Chinsurah.	The Prabhakar, Bombay.
The Dacca Prakash, Dacca.	The Native Opinion, „
The Jam Jehannama, Calcutta.	The Rast Goftar, „
The Urdu Guide, „	The Indu Prakash, „
The Umrita Bazar Patrika, Calcutta.	The Jam-i-Jamshed, „
The Bhagalpur Gazette, Bhagalpur.	The Bombay Samachar „
The Koh-i-Noor, Lahore.	The Kushful Akbbar, „
The Punjab Akhbar, „	The Lawrence Gazette, Meerut.
The Akhbar-i-Anjuman, „	The Kasi Patrika, Benares.
The Agra Akhbar, Agra.	The Berar Samachar, Hyderabad.

EUROPEAN GENERAL HOSPITAL, FORT DELHI.

No. 17.—MISCELLANEOUS.

Surg.-Maj. D. S. Smith, in charge.

„ W. Nash.

Surg. E. O'Sullivan.

„ B. B. Connolly.

„ G. J. H. Evatt.

GENERAL FIELD HOSPITAL, NATIVE TROOPS.

No. 18.—MISCELLANEOUS.

Camp Hindoo Rao's Grounds.

Dy. Surg.-Genl. E. B. Tuson, Surg.-Maj. and Mrs. W. Ed-
p. m. o. dows.

Mrs. Tuson. Surg. W. R. Murphy.

„ Cordner.

PUNJAB CIVIL CAMP.

No. 19.—MISCELLANEOUS.

Located outside City between Kashmir and Mori Gates.

Col. C. V. Jenkins, deputy commissioner, with Maharajah of
Kashmir.

Col. C. C. Minchin, in charge Nawab of Bhawulpore.

Col. Blair T. Reid, in charge Rajah of Chumba.

Capt. C. H. T. Marshall, in charge Punjab Civil and Visitors' Camps.

Dr. H. Bellew, C.S.I., sanitary commissioner.

PUNJAB CIVIL CAMP.—(Contd.)

Capt. W. J. Parker, with Rajah of Nahan.
 „ H. J. Lawrence, with Rajah of Jhind.
 Mr. G. W. Rivaz, with Rajah of Nabha.
 Capt. H. M. M. Wood, with Rajah of Bilaspore.
 „ R. Bartholomew, with Nawab of Malerkotta.
 Mr. T. G. Walker, with Rajah of Faridkot.
 „ F. T. Hewson, with Rajah of Mandi.
 „ J. A. Anderson, on special duty.
 „ Snow, assistant commissioner.
 „ Hastings, Punjab police.
 Capt. E. A. Money, deputy assistant quartermaster-general.
 „ L. J. H. Grey, in political charge of Punjab Chiefs.

Nos. 20, 21 & 22.—MISCELLANEOUS.

Visitors' Tents between Kashmir and Mori Gates.

Col. and Mrs. Parrott.	Mr. D. T. Roberts, C.S.
„ „ Robinson.	„ Williams, C.S.
Mr. and Mrs. W. A. Robinson.	„ P. Carnegie.
„ „ Herbert Norman.	Col. Carnegie.
Lieut. A. C. G. Lydiard.	Genl. P. F. Storey.
Mr. Levinge.	Mr. Heskith Biggs.
„ Sprenger, exce. engr.	„ Fitz Hugh-Cox, C.E.
„ Williams, asst. engr.	„ W. J. Church, C.S.
Col. W. C. Gott.	„ Campbell Thompson, C.S.
Capt. E. H. Steel.	Capt. F. J. Home, R.E.
Maj. W. Musgrave.	Col. N. Barton, 25th P.N.I.
Mr. Large, C.E.	„ J. Bonus, R.E.
„ Russell Barry, C.S.	„ H. King, 13th N.I.
Col. Davidson.	Maj. Pemberton.
„ F. Brine, R.E.	Mrs. Graham.

PUNJAB CIVIL CAMP.—(*Contd.*)

Visitors' Tents on Plot behind Civil Mess Tents.

Col. C. Marquis de Bourbel, R. E., and party.	Mr. Brind, exe. engr.
Col. C. H. Hall, dy. comr.	Col. E. C. S. Williams, dctr. S. railways & party.
„ B. Murray, R.A.	Capt. L. F. Boileau, R.E.

Plot behind the above.

Mr. Constable and party.	Mr. T. R. Wyer, C.S., & party.
„ W. C. Turner, C.S., and party.	„ Coulson.
„ Smith, C.S., and party.	„ J. B. N. Hennessey.
Capt. T. Howard, R.E.	The Rev. Murray Aynsley.

Plot to right rear of above.

Mr. Heath, exe. engr.	Mr. Bailey, C.E.
„ Young.	Lieut. J. H. A. Spyer, 18th regt.
„ Lovell, chief-engr., O. & R. railway.	Mr. Scanlan and party.
Mr. Bradford Leslie, agent, E. I. railway.	„ Alwynne Turner & party.
	„ Linders.

Glacis from Mori to Kabul Gate.

Mr. Mahadava Rao, photo- grapher.	Mr. Weston.
„ Saché.	„ D'Arcy Macarthy.
„ Murphy.	„ DeCourcy, E.A.C.
„ Thompson.	„ Scanlan.
„ Banerji.	„ Burke, photographer.
„ Francken.	„ Walter Butler and friends.



POLICE CAMPS.

No. 23.—MISCELLANEOUS.

HEAD-QUARTERS STATION.

Names of Police Officers and their respective charges.

Col. (& Mrs.) H. N. Miller, inspector-general of police.
 Capt. (& Mrs.) E. Newbery, personal assistant to inspector-general.
 Mr. W. Goldney, 2nd assistant to inspector-general.

1st Division Police.

Col. (& Mrs.) J. C. P. Baillie, deputy inspector-general.

Capt. Tucker	}	dist. supdts. H. E. the Viceroy's Camp.
Mr. Lemarchand		
„ Hammond		

Capt. R. C. Nicholetts, dist. supdt.	}	H. E. C.-in-C. and military camps.
Mr. G. A. Browne, asst. supdt.		
Ibrahim Khan, Khan Bahadoor, asst. supdt.		

Mr. (& Mrs.) A. C. Plowden, dist. supdt., presidency camps.

„ D. E. McCracken, asst. dist. supdt.	}	Camps of chief comrs. and misc. camps.

2nd Division Police.

Maj. O. Menzies, dy. inspr.-genl.	}	Camps of feudato- ries.
Mr. W. H. Mercer, dist. supdt.		
„ (& Mrs.) H. W. Jackson, dist. supdt.		
„ G. F. Taylor, dist. supdt.		
„ D. A. Turnbull, asst. supdt.		
Mian Shere Singh, asst. supdt.		

Mahomed Rashid, asst. supdt.

3rd Division Police.

Capt. (& Mrs.) Ewart, dy. insp.-genl.	}	City and suburbs.
„ Horsford, dist. supdt.		
Mr. (& Mrs.) C. Brown, dist. supdt.		
„ (& Mrs.) H. Beck, dist. supdt.		
„ H. Reid, asst. supdt.		
„ C. Hastings, asst. supdt.		
„ J. Tuiling, asst. supdt.		
„ Haslett, dist. supdt.		
„ Rotton, asst. supdt.		

POLICE CAMPS. (*Contd.*)

Mr. J. P. Warburton, district superintendent, in charge of detectives.

Lala Kanhya Lal, assistant superintendent, quartermaster.

Names of Police Stations and their localities.

No.	Police Station	Army Head-Quarters	..	No. on Map	
1				24	
2	"	Mulaha Gunj	..	"	25
3	"	Rajpore	..	"	26
4	"	Wazirabad	..	"	27
5	"	Azadpore	..	"	28

CAMP DAHEERPORE.

No. 29.—MISCELLANEOUS.

Officers in Charge of the Imperial Dais Works.

Fred. Kirby, Esq., executive engineer.
 Leslie Smith, Esq., dy. commissioner.
 H. Wacker, Esq., executive engineer.
 Fitz_Hugh-Cox, Esq., assistant engineer.

CAMP OF THE NIZAM OF THE DECCAN.

No. A.—SPECIAL.

His Highness Nizam Mir MAHBUB ALI KHAN, Bahadoor,
of Hyderabad, Nizam or Subadar of the Deccan.

Nawab Sir Salar Jung, Bahadoor,
Mooktiar-ool-Mulk
Suja-ud-Dowlah, G.C.S.I.,
prime minister.

Meer Layak Ali Khan, Bahadoor.

Meer Sadut Ali Khan, Bahadoor.

Nawab Vikar-ool-Oomrah,
Bahadoor.

„ Khoorsheed Jah, Bahadoor.

„ Yekbal-ood-Dowlah, Bahadoor.

„ Basheer-ood-Dowlah, Bahadoor.

Rajah Narander, Bahadoor.

Capt. Clarke.

Nizam Yar Jung, Bahadoor.

Shumsheer Jung, Bahadoor.

Sahab Jung, Bahadoor

Thahniah Yar-ood-Dowlah,
Bahadoor.

Rasheed-ood-Dowlah, Bahadoor.

Saiad-ood-Dowlah, Bahadoor.

Moostahakam Jung, Bahadoor.

Yekram Jung, Bahadoor.

Koovat Jung, Bahadoor.

Kadir Jung, Bahadoor.

Tahamtun Jung, Bahadoor.

Shahsawar Jung, Bahadur.

Moulvie Museehoozzaman
Khan Sahib.

Yehsam-ood-Dowlah, Bahadoor.

Soolaman Yar Jung, Bahadoor.

Sarum Jung, Bahadoor.

Wursalang Jung, Bahadoor.

Mokkuddum Jung, Bahadoor.

Honkam-ood-Dowlah, Bahadoor.

Burruck Jung, Bahadoor.

Agah Mirzah Beg Khan Sahib.

Syed Ibrahim Beg Khan Sahib.

Rajah Gopal Rao.

Mahomed Moozufferooddeen
Sahib.

Hakeem Mahomed Ali Sahib.

Moosseehood Dowran Khan,
Bahadoor.

CAMP OF THE NIZAM OF THE DECCAN.—(*Contd.*)

Hakeem Goolam Dustagir.	Saiad Abdool Vahab Sahib.
Mahomed Moizooddeen Sahib.	Saiad Baker Alee Khan Sahib.
Mr. Oliphant.	Meer Nasur Alee Sahib.
Syed Hoosain Belgramee.	Meer Abid Alee Sahib.
Mr. Krohu.	Roy Girdharee Pershad.
Meer Tahavoor Alee Sahib.	Siddee UMBER.
Meer Riasat Alee Sahib.	Mr. Henry Ogilvie.
Mahomed Siddeek Sahib.	

Maj. A. Havelock, commanding escort.

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CAMP OF THE GAEKWAR OF BARODA.

—————  
No. B.—SPECIAL.  
—————

His Highness Maharajah SYAJI RAO GAEKWAR, Bahadoor,  
of Baroda.

Her Highness the Maharanee JUMNABHAI, Mother of  
His Highness.

|                             |                           |
|-----------------------------|---------------------------|
| Sir T. Madava Rao, K.C.S.I. | Mir Kumaloodin Hossein    |
| Anandrao Wiswasrao Manay.   | Khan, nawab and sir subah |
| Kasseerao Sirkay.           | of contingent.            |
| Bulwunt Rao Manay.          | Capt. G. E. Money.        |
| Anund Rao Gaekwar.          | Jugdeo Rao Jugtap.        |
| Venayeh Rao Kirtane.        | Doulut Rao Manay.         |
| Mahadeorao Ramchundra.      | Bulwunt Rao.              |
| Gunput Rao.                 | Chintamon Rao Mujumdar.   |
|                             | Rughonath Rao.            |

CAMP OF THE MAHARAJAH OF MYSORE.

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No. C.—SPECIAL.

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Situated North of Chandraol Village.

His Highness Maharajah CHAM RAJENDRA WADIAR, Bahadoor, of Mysore.

- |                                |                       |
|--------------------------------|-----------------------|
| 1. His Highness the Maharajah. | 4. Mr. Ranga Charloo. |
| 2. } Ursoos or Companions      | 5 Mr. Ramaswamy.      |
| 3. } of the Maharajah.         | Mr. Nursamiengas.     |

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CAMP OF KHAN OF KHELAT.

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No. D.—SPECIAL.

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Situated west of Hindoo Rao's House.

His Highness the KHAN OF KHELAT.

His Highness is accompanied by 25 sirdars, 25 superior officers, and 275 followers. British Officer, Major Sandeman.

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CAMP OF SIAM DEPUTATION.

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No. E.—SPECIAL.

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Situated west of Hindoo Rao's House.

The Ambassador from the King of Siam is accompanied by a suite of 13 persons and 20 attendants. Attended by Captain Talbot.



CAMP OF NEPAL DEPUTATION.

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No. F.—SPECIAL.

Situated West of Hindoo Rao's House.

General Dhere Shumsher, Rana Bahadoor, represents the Maharaj Adhiraj of Nepal, accompanied by six officers and an escort.

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CAMP OF MUSCAT DEPUTATION.

No. G.—SPECIAL.

Situated West of Hindoo Rao's House.

The deputation from the Khan of Muscat consists of a minister and a member of the ruling family.

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SINDHIA'S CAMP.

---

No. 1.—CENTRAL INDIA.

---

His Highness Maharajah JAYAJI RAO SINDHIA,  
Bahadoor, G.C.S.I., of Gwalior.

Sir Gunput Rao, K.C.S.I.,  
Dewan.

General Bapoo Sahib Awhad.

Ranoji Rao Scindia.

Vithul Rao Scindia.

Shunkur Rao Gursod.

Bapoo Sahib.

Tatia Sahib Khanwalkur.

Suntoba Dada Sahib.

Ahsanally Sahib.

Major Kashee Rao Soorway.

Capt. Shumsher Khan.

HOLKAR'S CAMP.

---

No. 2.—CENTRAL INDIA.

---

His Highness Maharajah TUKAJI RAO HOLKAR,  
Bahadoor, G.C.S.I., of Indore.

|                                   |                        |
|-----------------------------------|------------------------|
| Sivaji Rao Holkar, elder son.     | Govind Rao, treasurer. |
| Yeshwunt Rao Holkar, younger son. | Ramchunder Vithul.     |
| Sir Kashee Rao Dadas,<br>K.C.S.I. | Wamon Rao.             |
| Ram Rao Narain, dewan.            | Mahomed Azeem Khan.    |
| R. Rughoonath Rao, minister.      | Kanoojee Goond.        |
| Bhowani Sing Sur Nobut.           | Sukaram Gopal.         |
| Rai Nanuck Chund.                 | Sudasheo Upadhia.      |
| Khuman Sing, buxee.               | Moulvie Sudur-ud-din.  |
| Col. Sukharam Martund.            | Bhikajee Shibnawis.    |
| Bapoo Sahib Bandey.               | Madho Rao, doctor.     |
| Appa Sahib Holkar.                | Kunhya Lal.            |
|                                   | Bapoojee Madho.        |
|                                   | Sukharam.              |

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CAMP OF BEGUM OF BHOPAL.

No. 3.—CENTRAL INDIA.

Her Highness Nawab SHAH JAHAN BEGUM,
G.C.S.I., of Bhopal.

Nawab Sadik Hussein Khan.	Murshi Jumal-u-din Mudar- ul-Maban.
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REWAH CAMP.

No. 4.—CENTRAL INDIA.

His Highness Maharajah RAGHURAJ SING, Bahadoor,  
G.C.S.I., of Rewah.  
Rundimon Sing, dewan.

OORCHA CAMP.

No. 5.—CENTRAL INDIA.

Maharajah PARTAP SING, Bahadoor, of Oorcha (Tehri)

|                          |                     |
|--------------------------|---------------------|
| Rao Guneshjoo.           | Pandey Roognundun.  |
| Rao of Simria.           | Lala Luchmun Sing.  |
| Sawai Kumedan, Bahadoor. | Kiledar Rampershad. |
| Jehan Beg.               | Rao Dasva Bali.     |
| Kumedan Sirdar Beg.      | Nund Kishore.       |
| Koowur Mungul Sing.      | Ram Bux.            |
| Koowur Tukhut Sing.      | Lala Kundun.        |
| Munshi Sheodial.         | Wizarut Hussein.    |
| Pandey Bhugwan Dass.     | Lala Hurpershad.    |

DATTIA CAMP.

No. 6.—CENTRAL INDIA.

Maharajah BHAWANI SING, Bahadoor, of Dattia.

|                            |                     |
|----------------------------|---------------------|
| Dewan Munnie Lall.         | Koowur Hirdesha.    |
| Munshi Nund Kishore.       | Rao Aman Sing.      |
| Rao Bahadoor Pahar Sing.   | Munshi Jai Lall.    |
| Dewan Bahadur Subdul Sing. | Pirshit Tilok Sing. |
| Koowur Runjeet Sing.       | Hakim Agha Mahomed. |
| Koowur Muhiput Sing.       | Rai Kulian Sing.    |



DHAR CAMP.

---

No. 7.—CENTRAL INDIA.

---

Rajah ANAND RAO PUAR, of Dhar.

|                           |                      |
|---------------------------|----------------------|
| Gopal Viswas Rao Karbari. | Ram Bhao.            |
| Govind Viswas Rao.        | Guneish Shastree.    |
| Mahadik Sahib.            | Pooranik.            |
| Baba Pathrekar.           | Balum Bhut.          |
| Bandey Sahib.             | Bhao Sahib Mungekur. |
| Damodhur Punth.           |                      |

DEWAS CAMP.

---

No. 8.—CENTRAL INDIA.

---

Rajah KRISHNAJI RAO BABA SAHIB, of Dewas  
(senior branch).

Jiwajee Rao Powar.  
Nilkunt Rao, tutor.  
Balkishun.

SUMPTHAR CAMP.

---

No. 9.—CENTRAL INDIA.

---

Rajah HINDUPAT, Bahadoor, of Sumpthar.

JOWRAH CAMP.

No. 10.—CENTRAL INDIA.

Nawab MAHAMMAD ISMAIL, Khan Bahadoor, of Jow rah.

Huzrut Noorkhan, minister.

Jai Lall, dewan.

Pundit Visheshur Nath.

RATLAM CAMP.

No. 11.—CENTRAL INDIA.

Rajah JASWAN SING, of Ratlam.

Mir Shahamat Ali, Khan Bahadoor, C.S.I., political agent and  
superintendent.

Thakur Mán Sing.

Maharajah Umletha.

Thakur Takhat Sing.

Munir-u-din.

PANNA CAMP.

No. 12.—CENTRAL INDIA.

Maharajah RUDDAR PARTAB SING, Bahadoor, K.C.S.I., of  
Panna.

CHIRKARI CAMP.

No. 13.—CENTRAL INDIA.

Maharajah JAE SING, Deo Bahadoor, of Chirkari.

Shaik Mahomed Usman, minister.

Chiman Rao.

Lyakut Hussein.

AJEYGARH.

No. 14.—CENTRAL INDIA.

Maharajah RANJOR SING, Bahadoor, of Ajeygarh.

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BIJAWUR CAMP.

No. 15.—CENTRAL INDIA.

Maharajah BHAU PERTAB SING, Bahadoor, of Bijawar.

~~~~~

CHATTERPUR CAMP.

No. 16.—CENTRAL INDIA.

Rajah BISHENNATH SING, Bahadoor, of Chatterpur.

~~~~~

BERONDA CAMP.

No. 17.—CENTRAL INDIA.

Rajah RUGHBER DIAL SING, of Beronda.

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TOREE CAMP.

No. 18.—CENTRAL INDIA.

Dewan PIRTHEE SING, Jagirdar of Toree.



JIGNEE CAMP.

—  
No. 19.—CENTRAL INDIA.  
—

Rao BHOPAL SING, Jagirdar of Jignee.

~~~~~

ALIPURA.

—
No. 20.—CENTRAL INDIA.
—

Rao CHUTTERPUTTEE, Jagirdar of Alipura.

~~~~~

PALDEO CAMP.

—  
No. 21.—CENTRAL INDIA.  
—

Chobey UNRODH SING, of Paldeo.

~~~~~

PIPLODA CAMP.

—
No. 22.—CENTRAL INDIA.
—

Thakoor DOOBEY SING, of Piploda.

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CAMP OF DHOLPUR RAJA.

—  
No. 1.—RAJPUTANA.  
—

His Highness Maharaj Rana NEHAL SING, Bahadoor, of  
Dholpur.

Kanwar Hardeo Sing.

Zenoo Deen.

Laloo Luchman Sing.

Laloo Narain Sing.

Jemadar Oomar Khan.

CAMP OF KARALI MAHARAJAH.

No. 2.—RAJPUTANA.

Maharajah ARJAN PAL, Deo Bahadoor, of Karali.

Thakur Maluk Pal.

Injat Nath Pal.

Nukar Pal.

Dewan Buldeo Sing.

Chowdri Sham Lal.

Rajab Bahardur.

Jabedar Dhip Sing.

Thakur Surjan Pal.

Jemadar Fazul Rasal Khan.

~~~~~  
CAMP OF BHURTPORE RAJAH.

No. 3.—RAJPUTANA.

Maharajah JUSWUNT SING, Bahadoor, of Bhurtpore.

~~~~~  
CAMP OF BUNDI RAJAH.

No. 4.—RAJPUTANA.

His Highness Maharao Rajah RAM SING, Bahadoor, of Bundi.

Arjan Sing.

Goburdun Sing.

Indur Sal.

Hanot Sing.

Amrat Sal.

Bhugwunt Sing.

Durjan Sal.

~~~~~  
CAMP OF KISHENGARH RAJAH.

No. 4.—RAJPUTANA.

Maharajah PIRTHI SING, Bahadoor, of Kishengarh.

CAMP OF NAWAB OF TONK.

No. 5.—RAJPUTANA.

Nawab MAHAMMAD IBRAHIM, Khan Bahadoor, of Tonk

Sahibzadah Hafiz Mahomed Ibadullah, Khan Sahib, prime minister.	Ahmad Ali Khan.
Mahomed Akram Khan.	Abdullah Khan.
Abdul Rahman Khan.	Mahomed Khan.
Ahmad Khan.	Mahomed Khan.
Ahmad Ullah Khan.	Hafiz Mahomed Inayatullah Khan.
Mahomed Khan (son of Mahomed Jaymal Khan).	Mahomed Khan (son of Abdul Karim Khan).
Hamid Khan.	Hafiz Mahomed Ishak Khan.
Addul Rahim Khan.	Hafiz Abdul Wahab Khan.
Abdul Majid Khan.	Abdul Sumad Khan.
Mahomed Shufi Ullah Khan.	Abdullah Khan.
Nuruddin Khan.	Mahomed Saiad Khan.
Ahmad Yar Khan.	Mahomed Isfand Yar Khan.
Abdul Rayuf Khan.	Imdad Ullah Khan.

CAMP OF ALWAR RAJAH.

No. 6.—RAJPUTANA.

Maharao RAJAH MANGAL SING, Bahadoor, of Alwar.

Thakur Sultan Sing, of Thana.	Thakur Beri Lal.
Pundit Rup Narain.	Thakur Buldeo Sing.
Rao Gopal Sing.	Bakshi Rao Har Buksh.
Thakur Kerat Sing.	Mr. Thomas Heatherly, depy. collr.
Thakur Hati Sing.	Ressaldar Oomrao Sing.
Ressaldar Bhupal Sing.	Ressaldar Kuman Sing.
Thakur Mungul Sing, member of state council.	Khawas Sheo Buksh.

CAMP OF JODHPUR RAJAH.

No. 7.—RAJPUTANA.

His Highness Maharajah JASWANT SING, Bahadoor,
G.C.S.I., of Jodhpur.

Maharaj Kishoor Sing Sahib.	Maharaj Bahardur Sing Sahib.
Thakur Raipur.	Thakur Asob.
Faizullah Khan Sahib.	Wazir Alli.

CAMP OF UDAIPUR MAHARANA.

Nos. 8 & 10.—RAJPUTANA.

His Highness Maharana SAJJAN SING, of Udaipur.

Bedle Raoji.	Barith Chitar Bhujji.
Meje Rawatji.	Bedam Raoji.
Anand Rawatji.	Parsoli Raoji.
Hamergarh Rawatji.	Karjali Babaji.
Tane Raj.	Lave Thakur.
Purdhan.	Kelve Thakur.
Badle Kanwarji.	Gogude Kanwarji.
Parsoli Kanwarji.	Palri.
Baba Taseh Singhji.	Kherabad Walonka Betta.
Mama Bukhtawar Singhji.	Mama Amar Singhji.
Banbore Rawatji.	Kakarive.
Siana.	Sampurawala.
Batterre Walonka Betta.	Banram Walonka Betta.
Doulutgarh Walonka Betta.	Maturi.
Boraj.	Borajka Khera.
Karan Singhji.	Jewana.
Turkan.	Chobhan Luchmunji.
Rathore Prathi Singhji.	Churawat Onarji.
Sangat.	Rathor Morji.
Ara Ram Lalji.	Dudwaran Sanwalji.
Dudwaram Onarji.	Bakhtawarji.

CAMP OF JHALLAWAR RAJAH.

No. 9.—RAJPUTANA.

Maharaj Rana ZALIM SING, Bahadoor, of Jhallawar.

Thakur Bizai Sing.

Raj Gopal Das.

Thakur Narput Sing.

Thakur Indur Sing.

Thakur Guman Sing.

Dhabai Onkar Nath.

Seth Harkechand.

Bahora Nathu Lal.



CAMP OF THE JAIPUR RAJAH.

No. 13.—RAJPUTANA.

His Highness Maharajah SEWAE RAM SING, Bahadoor,
G.C.S.I., of Jaipur.

Thakur Gobind Sing.

Raune Beejey Sing.

Thakur of Oonarah.

Rao Rajah Ketree.

Rao Rajah Seekur.

Thakur of Digi.

Thakur of Nawulgurh.

Thakur Futteh Sing, prime
minister.

Rao Rajah of Doolah.

Rajpootana Nobles.

The Rajah of Bhimae.

The Rajah of Rajgurh.

Thakur of Sawar.

The Diwanjee of the Durgah
Khwajeh Sahib.

Thakur of Massooda.

The Mootwullee of the Durgah
Khwajeh Sahib.

Rajah of Peesangun.

Seth Sumeer Mull.

Thakur of Joonean.

Seth Chund Mull.

Thakur of Deoleea.

Meer Nizam Ali.

Thakur of Khurwah.

Thakur of Bundunwarrah.

CAMPS OF CHIEFS AND NOBLES, BOMBAY PRESIDENCY.

No. 1.

Mir Ali Murad Khan, of
Khairpur.

No. 2.

His Highness Mohabbat
Khan, K.C.S.I., Nawab of
Junagarh.

No. 3.

Maharana Gambhir Singji,
Rajah of Raj Pipla.

No. 4.

His Highness Jam Shri Wib-
haji, of Nowanagar.

No. 5.

His Highness Takht Singji,
Thakur of Bhaunagar.

No. 6.

The Thakur Saheb of Morvi.

Bombay Native Gentlemen (not being ruling chiefs).

Hon. Rao Saheb Wishwanath
Narayan Mandlik.

Hon. Nacoda Mahommed Ali
Rogay.

Sir Jamsetjee Jeejeebhoy,
Bart., C.S.I.

Haji Ismael Haji Habib, Esq.

Byramjee Jeejeebhoy, Esq.,
C.S.I.

Shantaram Narayan, Esq.

Rughoonath Narayan Khote,
Esq.

Sir Mungaldass Nuthoobhoy,
Kt., C.S.I.

Morarjee Goculdass, Esq.

Hon. Rao Bahadoor Becher-
dass Ambaidass, C.S.I.

Rao Bahadoor Gopalrao Huri.

Khunderao Saheb Raste.

Mir Sayed Alam Khan Saheb,
Nawab of Behte.

Jugjivandass Khooshaldass.

Mir Ghulam Baba.

Vehridass Ajoobhai *alias*
Bapu Saheb.

Rao Bahadoor Shumboo Per-
sad.

British Officers Attached.

Col. W. C. Parr.

Capt. G. E. Hancock.

„ Simpson.

„ Humphrey.

Mr. Peile.

Mr. Fitzgerald.

Dr. L. S. Bruce.

Capt. G. C. Sartorius, dy.
asst. qr. mr.-genl.

CAMPS OF CHIEFS AND NOBLES, MADRAS PRESIDENCY.

1. The Prince of Arcot.	Son. Kurum Moollah Khan.
Brothers. Ondut Audoulah, Bahad- door.	Secretary. Hyder Jung Bahadoor.
Madziz Audoulah, Baha- door.	In charge. Lieut.-Col. Tyrrell, M.N.I.

3. The Rani of Tanjore. Luckoram Sahib, husband.	Mrs. Firth, interpreter.
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3. The Zemindar of Pittapur.	4. The Zemindar of Elliapu- ram.
5. Geypoti Rao.	6. Humayoon Bahadoor.
7. Rameenger.	8. Muteesamee Ayer.

CAMP OF RAJAH OF JHIND.

No. 3.—PUNJAB.

His Highness Rajah RAGHBEER SING, Bahadoor, G.G.S.I.,
of Jbind.

Hur Suroop.	Ruttun Sing.
Raheem Buksh.	Bir Sing.
Shumbunath.	Faiz Mahomed Khan.
Abas Ali.	Nujjuf Alli.
Chundoo Lall.	Summunt Sing.
Ram Gopal.	Mohur Sing.
Uttum Sing.	Ummur Khan.
Juggut Sing.	

CAMP OF THE NABHA RAJAH.

No. 4.—PUNJAB.

Rajah HIRA SING, Bahadoor, of Nabha.

Dewan Bishun Sing.

Hakeem Ahmed Bux.

Mir Wazir Ali, judge, adaw-lutee.

Mir Munshi Ram Dial Mull.

Budroodeen Khan, bukshee.

Agent Dewan Sing.

Nazim Monubber Ali Khan.

Sheristadar Sudur Sing.

Hakim Sudroodeen.

Sirdar Sham Sing.

CAMP OF THE YARKUND ENVOY.

No. 5.—PUNJAB.

H. E. SEYYID YAKUB KHAN, Envoy from Yarkand.

CAMP OF PUNJAB NOBLES.

No. 6.—PUNJAB.

1. Rajah Hurbun Sing of Lahore, in camp.
Sirdar Ram Mool Sing.
2. Rajah Sir Sib Dial Sing, K.C.S.I., in camp.
Sirdar Churrun Dass.
3. ———
4. Rajah Amar Chand of Nadaun, in the city.
5. Kanwar Harnam Sing of Kapurthala, in Punjab civil camp.
6. Sirdar Bikraman Sing, Bahadoor, of Kapurthala, in camp.
7. Shahzada Shapur of Ludhiana, in camp.
8. Nawab Sarfaraz Khan, Sadozai of Dehra Ismael Khan, in camp.

CAMP OF PUNJAB NOBLES.—(*Continued.*)

9. Nawab Ghulam Hassan Khan, Alizai of Dehra Ismael Khan, in camp.
10. Nawab Muhammad Akram Khan, C.S.I., of Hazara, in camp.
11. Baba Khem Sing, Bedi of Rawalpindi, in camp.
12. Sirdar Ajit Sing, Atariwala of Amritsar, in city.
13. Sirdar Surat Singh, Majithia, C.S.I., of Amritsar, in camp.
14. Nawab Nawazish Ali Khan, Kazibash of Lahore, in camp.
15. Captain Golab Sing of Atari, Amritsar, in Viceroy's camp.
16. Sirdar Jiwan Sing, Buriya of Umballa, in camp.
17. Muhammad Hyat Khan, C.S.I., of Rawalpindi, in Press camp.
18. Bahadoor Sher Khan, Bangash, Khan Bahadoor, of Kohat, in camp.
19. Sirdar Uttam Sing of Rampore (Malaudh), Ludhiana, in camp.
20. Mir Bakar Ali Khan of Kotaha, Umballa, in camp.
21. Malik Fateh Sher Khan, Khan Bahadoor, of Shahpur, in camp.
22. Malik Sher Muhammad Khan, Khan Bahadoor, of Shahpur, in camp.
23. Bhai Charanjit Sing of Lahore, in camp.
24. Guru Fatah Sing of Kot Harsahai, Ferozepore, in camp.
25. Fatah Khan, Gheba of Kot, Rawalpindi, in camp.
26. Pundit Manphul, C.S.I., of Lahore, in city.
27. Nawab Abdul Majid Khan, Mooltani, Saddozai of Lahore, in camp.
28. Ghulam Kadir Khan, Khakwani of Mooltan, in camp.
29. Mian Shah Nawaz Khan, Sarai of Dehra Ghazi Khan, in camp.
30. Rajah Jahandad Khan, Ghakkar of Hazara, in camp.
31. Malik Sahib Khan, C.S.I., Tiwanna of Shahpur, in camp.
32. Muhammad Sarfaraz Khan, Mohmand of Peshawar, in camp.
33. Arbab Abdul Majid Khan, Khalil of Peshawur, in camp.
34. Ali Wardi Khan of Derajat, in camp.
35. Muzaffar Khan of Hangu, Bangash of Kohat, in camp.

CAMP OF PUNJAB NOBLES.—(*Continued.*)

36. Malik Aulia Khan of Rawalpindi, in camp.
37. Malik Fatah Khan of Rawalpindi, in camp.
38. Ayaz Khan of Bannu, in camp.
39. Imam Baksh Khan, Mazari of Dehra Ghazi Khan, in camp.
40. Jamal Khan, Laghari of Dehra Ghazi Khan, in camp.
41. Bahadoor Khan, Khosa of Dehra Ghazi Khan, in camp.
42. Miran Khan, Drishak of Dehra Ghazi Khan, in camp.
43. Ghulam Haidar Khan, Gurchani of Dehra Ghazi Khan, in camp.
44. Ghulam Haidar Khan, Lund of Dehra Ghazi Khan, in camp.
45. Fazl Ali Khan, Kasrani of Dehra Ghazi Khan, in camp.
46. Dost Muhammad Khan, Bozdar of Dehra Ghazi Khan, in camp.
47. Kaure Khan, Khetran of Dehra Ghazi Khan, in camp.
48. Fakir Zahur-ud-din of Lahore (Ludhiana), in camp.
49. Fatteh Khan, Dhrek of Rawalpindi, in camp.
50. Rai Mull Sing of Lahore, in camp.
51. Khan Muhammad Shah, Khan Bahadoor, of Amritsar, in city.
52. Mian Muhammad Jan, Kashmiri of Amritsar, in city.
53. Rai Sahib Sing of Delhi, in city.
54. Rai Umrao Sing of Delhi, in city.
55. Pandit Moti Lall of Lahore, in camp of Lieut.-Govr. of the Punjab.

CAMP OF RAJAH OF MANDI.

No. 7.—PUNJAB.

Rajah BIJAE SEIN, Bahadoor, of Mandi.

Wuzir Uttum Sing.

Sirdar Mir Bag Sing.

Sirdar Mir Man Sing.

Sirdar Mir Jai Sing.

CAMP OF RAJAH OF NAHAN.

No. 8.—PUNJAB.

Rajah SHAMSHER PARKASH, Bahadoor, K.C.S.I.,
of Nahan (Sirmur).
Sirdar Surat Sing.
Kishun Lall, tutor.

CAMP OF RAJAH OF MALERKOTLA.

No. 9.—PUNJAB.

Nawab MAHAMMAD-IBRAHIM ALI, Khan Bahadoor, of
Malerkotla.
Pundit Mohun Lall.

CAMP OF RAJAH OF FARIDKOT.

No. 10.—PUNJAB.

Rajah BIKRAM SING, Bahadoor, of Faridkot.
Sirdar Ram Sing.
Sirdar Narain Sing.

CAMP OF RAJAH OF BILASPUR.

No. 11.—PUNJAB.

Rajah HIRA CHAND, of Bilaspur (Khyher).

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CAMP OF RAJAH OF CHAMBA.

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No. 12.—PUNJAB.

---

Rajah SHAM SING, of Chamba.

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CAMP OF RAJAH OF SUKET.

No. 13.—PUNJAB.

Rajah RUDDAR SEIN, of Suket.

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CAMP OF THE KASHMIR MAHARAJAH.

---

No. 1.—PUNJAB.

---

His Highness Maharajah RANBIR SING, Bahadoor, G.C.S.I.,  
of Jammu and Kashmir.

Dewan Jowalla Sahai.

Wazir Sib Churn.

Dewan Anant Ram.

Comdt. Jodh Sing.

Dewan Gobind Sahai.

Dewan Karram Chand.



CAMP OF THE BHAWALPUR NAWAB.

---

No 2.—PUNJAB.

---

Nawab SADEK MAHAMMAD, Khan Bahadoor, of Bhawalpur.

|                                             |                                 |
|---------------------------------------------|---------------------------------|
| Capt. J. Burne, and Mr. J. C. Doran, tutor. | Col. C. C. Minchin, pol. agent. |
| Mr. J. W. Barnes.                           | Capt. S. Beckett, asst. do.     |
| Nazim Noor Mahomed Khan.                    | Dr. J. Young, M.D.              |
| Dewan Juttoo Mull.                          | Pundit Lalljee Pershad, judge.  |
| Comdt. Sher Shah & Subadar-                 | Nazim Shaik Ferozedeem.         |
| Major Gama Shah.                            | Band Master.                    |

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CAMPS OF CHIEFS AND NOBLES, N.-W. PROVINCES.

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No. 1.

His Highness Nawab MAHAMMAD KALB ALI, Khan Bahadoor, G.C.S.I., of Rampur.

---

No. 2.

His Highness the RAJAH OF TEHREE (Gurhwal).

---

No. 3.

His Highness Maharajah ISWARIPARSHAD NARAYAN SING, Bahadoor, of Benares.

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Nobles.

- |                                                 |                                          |
|-------------------------------------------------|------------------------------------------|
| 1. Rajah Sir Dinkur Rao.                        | 1. Sayad Ali Shah, Nawab of Sardhana.    |
| 1½. Mahendra Mahendra Sing, Rajah of Bhada-war. | 1½. Tikam Sing, C.S.I., Rajah of Mursan. |

CAMPS OF CHIEFS, AND NOBLES, N.-W. P.—(*Contd.*)

- |                                             |                                                     |
|---------------------------------------------|-----------------------------------------------------|
| 2. Rajah Shiva Pershad.                     | 2. Azmat Ali Khan, Nawab of Karnal.                 |
| 2½. Ram Pertab Sing, Rajah of Mainpuri.     | 2½. Mahomed Faiz Ali Khan, Nawab of Pahasu.         |
| 3. Dilsukh Rai, Rajah of Bilram.            | 3. Ram Sing, Rajah of Bansi.                        |
| 3½. Narotan Sing, Rajah of Eka.             | 3½. Lachman Sing, Rajah of Asothur.                 |
| 4. Sheoraj Sing, C.S.I., Rajah of Kashipur. | 4. Kishan Partab, Bahadoor Sahai, Rajah of Tamkulu. |
| 4½. Jagah Nath Sing, Rajah of Pawayan.      | 4½. Uday Narayan Mal, Rajah of Maghouli.            |
| 5. Rajah Kalka Pershad.                     | 5. Mahesh Sitta Buksh Sing, Rajah of Basti.         |
| 5½. Jaga Sing, Rajah of Tajpur.             | 5½. Bhawani Girdani Pal, Rajah of Mahuli.           |
| 6. Raumast Sing, Rajah of Katehra.          | 6. Lal Ram Partab Sing, Rajah of Manda.             |
| 6½. Kesho Rao Dinkur, Rajah of Gursarai.    | 6½. Banspat Sing, Rajah of Bara.                    |
| 7. Raghonath Sing, Rajah of Kura.           | 7. Tejhal Sing, Rajah of Daia.                      |
| 7½. Ram Chunder Sing, Rajah of Rajow.       | 7½. Rajah Shambu Narayan Sing.                      |
| 8. ———                                      | 8. Rajah Shiva Prasada, C.S.I.                      |
| 8½. Rajah Jaikishun Das, C.S.I.             | 8½. Thakur Pershad Narain, Rajah of Huldi.          |



## CAMPS OF CHIEFS AND NOBLES, CENTRAL PROVINCES.

Tents in Street running North and South.

1. Rajah of Kalahandi.
2. Rajah of Sonapur.
3. Rajah of Bamra.

Tents in Street running East and West.

1. Rajah Janoji Bhonsla.
2. Nana Ahir Rao.
3. Ahilji Ahir Rao.

CAMPS OF CHIEFS & NOBLES, CENTRAL PROVINCES.—(*Contd.*)

- |                         |                             |
|-------------------------|-----------------------------|
| 4. Rajah of Chinkhadan. | 4. Krishna Rao Goojur.      |
| 5. Rajah of Nandgaon.   | 5. Ramchunder Rao.          |
|                         | 6. Raghoba Mohitea.         |
|                         | 7. Nana Chitnawur.          |
|                         | 8. Africhund, Rai Bahadoor. |
|                         | 9. Rajah Suliman Shah.      |
|                         | 10. Rajah Kamran Shah.      |
|                         | 11. Zemindar of Ahiri.      |
|                         | 12. Khurshed Hassan.        |
|                         | 13. Yadho Rao Pandi.        |
|                         | 14. Rajah of Taliga.        |
|                         | 15. Baboo Balwant Rao.      |
|                         | 16. Ram Rao Krishna Rao.    |
|                         | 17. The Bhuskata.           |
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CAMPS OF NOBLES AND NATIVE GENTLEMEN, BENGAL.

- |                                                      |                      |
|------------------------------------------------------|----------------------|
| Maharajah KRISHNA PURTAB SAHI, Bahadoor, of Huttooh. |                      |
| Baboo Jagoonun Pershad Narain Sing.                  | Rughoobur Dyal.      |
| Goorhoo Ojah.                                        | Sew Raj Lall.        |
| Debi Patuck.                                         | Khaja Ahmed Hossain. |
| Ramoogra Sing.                                       | Ram Gopal Sing.      |
| Sher Purtab Narain.                                  | Debi Pandey.         |
|                                                      | Chorni.              |
- 

- |                                |                   |
|--------------------------------|-------------------|
| Nawab AMIR ALI, Khan Bahadoor. |                   |
| Afzulooddeen Ahmed.            | Bagorlori Tahman. |
| Wajid Hossain.                 | Dr. Hashim.       |



CAMPS OF NOBLES, &C., OF BENGAL.—(*Contd.*)

Maharajah Sir JYMUNGUL SING, Bahadoor, K.C.S.I,  
of Bhaugulpore.

|                              |                     |
|------------------------------|---------------------|
| Rajah Sheo Pershad Sing.     | Ban Ali Khan.       |
| Konwur Hurpershad Sing.      | Bhikari Lall.       |
| Konwur Isripershad Sing.     | Sumbhoo Sohaie.     |
| Konwur Goorpershad Sing.     | Pir Ali.            |
| Lala Purmeshuripershad Sing. | Haji Mahomdee.      |
| Lala Sardahpershad Sing.     | Shaik Abdool Hamid. |

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Nawab SYUD ASGHUR ALI, Khan Bahadoor, Diter Jung,  
C.S.I.

Nawab Ahmed Ali, Khan Bahadoor.

Mahomed Sharif.

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Maharajah MAHESHUR BUKSH SING, Bahadoor, of Doomraon.

|                           |                    |
|---------------------------|--------------------|
| Rajah Radah Pershad Sing. | Wahidoodin.        |
| Jyprakash Lall.           | Randhir Parshad.   |
| Lalla Dalloo Lall.        | Baboo Ramain Sing. |

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Rajah NIRPINDAR NARAIN BHOOP, of Cooch Behar.

Jogendur Narain Konwar.

St. John Kneller, Esq.

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Rajah HURBULLUB NARAIN SING, Bahadoor, of Sombursah.

---

Maharajah SUKH MESUR SING, Bahadoor, of Durbungah.

Baboo Rameshwur Sing.

„ Loteshwur Sing.

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Rajah Harendra Krishna, Bahadoor.

Rajah Jotendro Mohun Tagore, Bahadoor.

Baboo Jagodanund Mookerjee.

CAMPS OF NOBLES, &C., OF BENGAL.—(*Continued.*)

Moulvie Abdool Latif, Khan Bahadoor.

Nawab Mahomed Amir Ali, Khan Bahadoor.

„ Hussan Ali, Khan Bahadoor.

„ Anwur Shah, eldest son of ex-King of Oudh.

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OUDH CAMP.

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Members of the ex-Royal Family.

Nawab Mirza Mahomed Mustaffa Ali Hyder, Bahadoor.

Nawab Mirza Suliman Kudr, Bahadoor.

Nawab Mumtazuddowla, Bahadoor.

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Talukdars.

The Hon'ble Sir Dig Bejae Sing, Bahadoor, K.C.S.I., Maharajah of Bulrampur.

Lal Trilokinath Sing of Shahganj.

Rajah Hanwant Sing, Bahadoor, of Kalakankar.

Rajah Hardeo Baksh, Bahadoor, C.S.I., of Katiari.

Rudr Partab Sing of Dehra.

Rajah Amir Hassan Khan, Bahadoor, of Mahmudabad.

Rana Shankar Baksh, Bahadoor, of Khajurgaon.

Rajah Farzan Ali, Khan Bahadoor, of Jehangirabad.

Rajah Jang Bahadoor, Khan Bahadoor, of Nanpara.

Mahomed Kazim Hassain Khan of Paintipur.

Rajah Joymohan Sing of Kamrawan.

Rajah Anoudh Sing, Bahadoor.

Rajah Joymohan Sing, Bahadoor, of Chandapur.

Rajah Indra Bikram Shah of Khyrigurh.

Rajah Maneshur Baksh of Mullapur.

Thakur Sarabjit Sing of Ramnagar.

OUDH CAMP.—(*Contd.*)

Rajah Sher Bahadoor Sing Bahadoor, of Kaniar.

Dewan Mathon Das }  
Dewan Achru Mal } of Baundi.

Sirdar Autar Sing of Bela Bhela.

Chandhai Mahomed Khaclat Hussain, Bahadoor, of Kakrati.

Thakur Bishnath Baksh of Hasnapur.

Baboo Sarabjit Sing of Tikooi.

Thakur Buldeo Baksh, Bahadoor, of Akhoi.

Kazim Hussain Khan of Bhatwamow.

Rai Ibrahim Bali of Rampur.

Seth Sitaram of Maizuddinpur.

Thakur Ajudhia Baksh, Bahadoor, of Narinpur Charhar.

Nawab Ali Khan of Maila Raeganj.

Mirza Abbas Beg, Bahadoor, of Baragaon.

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Officials.

Capt. Frank Barrow, B.S.C., assistant commissioner.

Mirza Kalb Ali Khan, extra assistant commissioner.

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IN CAMP OF CHIEF COMMISSIONER OF BURMAH.

—————

Burmese Gentlemen.

Moung Oon.

Moung Bah Too.

Oo Pan Gyee.

Tha Dway.

Pha Pyoo.

Moung Huyeen.

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## FOREIGN DEPARTMENT.

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### NOTIFICATION.

POLITICAL.

*Simla, the 18th August 1876.*

No. 1891P.

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### PROCLAMATION.

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AS VICEROY AND GOVERNOR-GENERAL OF INDIA, I hereby publish for the information of the Governors, Administrators, Princes, Chiefs, Nobles, and Peoples of this Empire, the subjoined Act passed by the Imperial Parliament of Great Britain and Ireland on the twenty-seventh day of April, in the year of Our Lord one thousand eight hundred and seventy-six, together with a Royal Proclamation, dated at the Court of Windsor the twenty-eighth day of April one thousand eight hundred and seventy-six, in the thirty-ninth year of HER MAJESTY'S reign, transmitted to this Government by the MOST HON'BLE THE SECRETARY OF STATE FOR INDIA in his Lordship's Despatch No. 70 of the 13th July 1876.

Moreover, I now publicly notify, under this my hand and seal, that it is my intention to hold at Delhi, on the 1st day of January 1877, an Imperial Assemblage for the purpose of proclaiming to the QUEEN'S subjects throughout India the gracious sentiments which have induced HER MAJESTY to make to HER Sovereign Style and Titles an addition specially intended to mark HER MAJESTY'S interest in this great Dependency of HER Crown, and HER Royal confidence in the loyalty and affection of the Princes and Peoples of India.

To this Assemblage I propose to invite the Governors, Lieutenant-Governors, and Heads of Administrations, from all

parts of the QUEEN'S Indian Dominions, as well as those Princes, Chiefs, and Nobles, in whose persons the antiquity of the past is associated with the prosperity of the present, and who so worthily contribute to the splendour and stability of this great Empire.

I shall forthwith issue such orders in Council as may be suitable to the historical importance of the occasion, and in conformity with the desire which will be felt by all HER MAJESTY'S subjects in India to manifest the affection they cherish for their august SOVEREIGN by public rejoicings and appropriate demonstrations of loyalty.

Dated at Simla, this eighteenth day of August 1876.

(Sd.) LYTTON.

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## ANNEXURES.

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[39 VIC., CAP. 10.]

No. 1. ]

AN Act to enable Her Most Gracious Majesty to make an addition to the Royal Style and Titles appertaining to the Imperial Crown of the United Kingdom and its Dependencies. [27th April 1876.]

[Transmitted in Secretary of State's Despatch No. 28 (Legislative) of 29th June 1876.]

WHEREAS by the Act for the Union of Great Britain and Ireland passed in the fortieth year of the reign of His late Majesty King George the Third, chapter sixty-seven, it was provided that after such Union as aforesaid the Royal Style and Titles appertaining to the Imperial Crown of the United Kingdom and its Dependencies should be such as His Majesty by His Royal Proclamation under the Great Seal of the United Kingdom should be pleased to appoint ;

And whereas by virtue of the said Act and of a Royal Proclamation under the Great Seal, dated the first day of January one thousand eight hundred and one, the present style and titles of

Her Majesty are “ Victoria by the Grace of God of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith :”

And whereas by the Act for the better government of India passed in the Session of the twenty-first and twenty-second years of the reign of Her present Majesty, chapter one hundred and six, it was enacted that the Government of India, theretofore vested in the East India Company in trust for Her Majesty, should become vested in Her Majesty, and that India should thenceforth be governed by and in the name of Her Majesty, and it is expedient that there should be a recognition of the transfer of Government so made by means of an addition to be made to the style and titles of Her Majesty :

Be it therefore enacted by the Queen’s Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

It shall be lawful for Her Most Gracious Majesty, with a view to such recognition as aforesaid of the transfer of the Government of India, by Her Royal Proclamation under the Great Seal of the United Kingdom, to make such addition to the Style and Titles at present appertaining to the Imperial Crown of the United Kingdom and its Dependencies as to Her Majesty may seem meet.

Power to Her Majesty to make addition to style and titles of Crown.

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No. 2.]

No. 70, dated India Office, 13th July 1876.

From—HER MAJESTY’S SECRETARY OF STATE FOR INDIA,  
To—The GOVERNMENT OF INDIA.

I FORWARD herewith, for the information of Your Excellency’s Government, copy of the Queen’s Proclamation notifying the assumption by Her Majesty of the title of “ Empress of India.”



2. This act on the part of Her Majesty is a formal and emphatic expresssion, for which it seemed to the Queen that the opportunity was eminently suitable, of the favorable sentiments which She has always entertained towards the Princes and Peoples of India. I request that Your Excellency will proclaim throughout Her Majesty's Indian Dominions, in a manner suitable to Her gracious intentions, the addition which has been made to the Royal Style and Titles.

(Sd.) SALISBURY.

~~~~~  
BY THE QUEEN.

—
A PROCLAMATION.
—

VICTORIA, R.

WHEREAS an Act has been passed in the present Session of Parliament, intituled "An Act to enable Her Most Gracious Majesty to make an addition to the Royal Style and Titles appertaining to the Imperial Crown of the United Kingdom and its Dependencies," which Act recites that, by the Act for the Union of Great Britain and Ireland, it was provided that after such Union the Royal Style and Titles appertaining to the Imperial Crown of the United Kingdom and its Dependencies should be such as His Majesty by His Royal Proclamation under the Great Seal of the United Kingdom should be pleased to appoint: and which Act also recites that, by virtue of the said Act, and of a Royal Proclamation under the Great Seal, dated the 1st day of January 1801, Our present Style and Titles are "Victoria, by the Grace of God, of the United Kingdom of Great Britain and Ireland, Queen, Defender of the Faith:" and which Act also recites that, by the Act for the better government of India, it was enacted that the Government of India, theretofore vested in the East

India Company in trust for Us, should become vested in Us, and that India should thenceforth be governed by Us and in Our name, and that it is expedient that there should be a recognition of the transfer of Government so made by means of an addition to be made to Our Style and Titles: And which Act, after the said recitals, enacts that it shall be lawful for Us, with a view to such recognition as aforesaid, of the transfer of the Government of India by Our Royal Proclamation under the Great Seal of the United Kingdom, to make such addition to the Style and Titles at present appertaining to the Imperial Crown of the United Kingdom and its Dependencies as to Us may seem meet; we have thought fit, by and with the advice of Our Privy Council, to appoint and declare, and We do hereby, by and with the said advice, appoint and declare that henceforth, so far as conveniently may be, on all occasions and in all instruments wherein Our Style and Titles are used, save and except all Charters, Commissions, Letters Patent, Grants, Writs, Appointments, and other like instruments, not extending in their operation beyond the United Kingdom, the following addition shall be made to the Style and Titles at present appertaining to the Imperial Crown of the United Kingdom and its Dependencies; that is to say, in the Latin tongue in these words: "*Indiæ Imperatrix.*" And in English tongue in these words: "Empress of India."

And Our will and pleasure further is, that the said addition shall not be made in the Commissions, Charters, Letters Patent, Grants, Writs, Appointments, and other like instruments, hereinbefore specially excepted.

And Our will and pleasure further is, that all gold, silver, and copper moneys, now current and lawful moneys of the United Kingdom, and all gold, silver, and copper moneys which shall, on or after this day, be coined by Our authority with the like impressions, shall, notwithstanding such addition to Our Style and Titles, be deemed and taken to be current and lawful moneys of the said United Kingdom; and further, that all moneys coined

for and issued in any of the Dependencies of the said United Kingdom, and declared by Our Proclamation to be current and lawful money of such Dependencies, respectively bearing Our Style, or Titles, or any part or parts thereof, and all moneys which shall hereafter be coined and issued according to such Proclamation, shall, notwithstanding such addition, continue to be lawful and current money of such Dependencies respectively, until Our pleasure shall be further declared thereupon.

Given at Our Court at *Windsor*, the twenty-eighth day of *April*, one thousand eight hundred and seventy-six in the thirty-ninth year of Our Reign.

GOD save the QUEEN.

By order of His Excellency the Viceroy
and Governor-General of India in Council,

T. H. THORNTON,

Offg. Secy. to the Government of India.

EXHIBITION OF JEWELLERY AND OTHER ARTICLES OF
INDIAN MANUFACTURE & SPECIAL EXCELLENCE.

Officer in Charge :—E. WOODALL PARKER, *Judge, S. C. Ct., Delhi.*

THE Exhibition will be held in the District Court-houses and grounds which lie to the left of and close to the Kashmir Gate.

In the first building which comes in view (the Small Cause Court-house) Shawls, Silks, Embroidered Fabrics, “Kimkhab” from Kashmir, Benares, and other parts of India will be displayed.

To the right of this house, and separated from it only by the road, lie six sheds, which will be occupied by artificers in brass, steel, and glass from Kurnal and elsewhere.

Following the road visitors will pass one or two tents with stalls arranged under canvas in front of them.

Beyond these the main building (District Court) will be found ; the three large rooms on the first floor of which, together with the smaller rooms adjoining them, will be devoted to a magnificent display of jewellery from all parts of India. Below, on the ground floor, one large room will also be devoted to gold and silver work ; the other being principally devoted to Indian brass work and inlaid steel (*kufthgurri*) work, together with other articles of Indian manufacture having a special interest.

In a detached building facing these rooms will be found a large number of stalls, also filled with articles of similar kind. To the left lies a shed, in which a shawl loom from Umritsur will be seen in actual work.



THE IMPERIAL ASSEMBLAGE RACES.

A new Course for use during the Assemblage has been made under the superintendence of Major F. Hill, R.A., about two miles north of the Old Cantonments. The approach to it is by the Alipur Road until the Escape Canal is passed, then by the Bhagput Road as far as the village of Daheerpur, where a made-road to the right leads to the Grand Stand.

The Race Course is one mile two furlongs and 142 yards long, and the Steeplechase Course is one mile four furlongs and 140 yards.

For further information, see advertisement page of this Directory.

POINTS OF HISTORIC INTEREST CONNECTED WITH THE IMPERIAL CITY OF DELHI.

OLD DELHI.

The ruins of Ancient Delhi extend southward from the present City to the Kootub, which is about eleven miles distant from the Kashmir Gate, and comprise the sites of many distinct cities founded by different Emperors ; the ruins of the walls can in many places be seen ; the positions are noted in the officially published maps.

Ancient Delhi is reputed to have been built by Rajah Dehloo-Dilli, or Dhili ; the date is uncertain, but it would probably be about 57 B. C. That portion of Old Delhi around the Kootub is, however,* supposed to have been built 328 B. C.

MODERN DELHI.

Modern Delhi was founded by the Emperor Shah Jehan about the year 1620 A. D., but is now styled after the name of the reputed founder of the ancient city.

Objects of Special Interest at Delhi and in the Neighbourhood.

The Dâk Bungalow, Post Office, Telegraph Office, &c., commonly known as the Old Magazine, a portion of which was blown up by Lieutenant Willoughby in 1857 to prevent its falling into the hands of the rebels.

The New Cemetery, outside Kashmir Gate, where lie the mortal remains of Brigadier-General John Nicholson and other distinguished officers.

The Kashmir Gate. A memorial has recently been erected at this Gate, the inscription of which is as follows :—" On the 14th September 1857, the British Force stormed Delhi. It was after sunrise on that day that the undermentioned party, advancing from

* Cooper's Hand-Book.

Ludlow Castle in the face of a heavy fire, and crossing this bridge which had been almost totally destroyed, lodged powder bags against and blew in the right leaf of this Gate, thus opening a way for the assaulting column :—

Lieut. Duncan Home,	}	Bengal Engineers.
„ Philip Salkeld, mortally wounded,		
Sergt. John Smith,	}	Bengal Sappers and Miners.
„ A. B. Carmichael, killed,		
Corporal F. Burgess, killed,		
Bugler Hawthorne		52nd Foot.
Soobadar Toola Ram,	}	Bengal Sappers and Miners.
Jemadar Bis Ram,		
Havildar Madhoo, wounded,		
„ Tilok Sing, mortally wounded,		
Sepoy Ram Hetlo, killed,		

“ This Memorial is placed here as a tribute of respect to these gallant soldiers by General Lord Napier of Magdala, Colonel, Royal Engineers, and Commander-in-Chief in India.

1876.”

Ludlow Castle, the Metcalfe Estate, Hindoo Rao's House, Sammy House, Mosque, Flag Staff Tower.

The Delhi Mutiny Monument. “ In memory of the officers and soldiers, British and Native, of the Delhi Field Force, who were killed in action or died of wounds or disease between the 30th May and 20th September 1857. ‘ This Monument has been erected by the comrades who lament their loss, and by the Government they served so well.’ ”

Siege Batteries. Six miniature embrasures have recently been built, at the suggestion of Lord Napier of Magdala, to mark the position of the batteries ; the inscription thereon gives the names of the officers who commanded the batteries, with armament, &c.

The Institute, Museum, &c.,	}	Chandni Chouk.
Queen's Gardens, with Menagerie,		
Clock Tower,		
The Juma Musjid.		

The Fort or Palace; the Dewan A'm, or Hall of Public Audience; the Dewan Khass, or Hall of Audience; the Peacock Throne; the Pearl Mosque and King's Baths.

Feroze Shah's Lāt. About half a mile south of Delhi, there is another stone pillar of a similar nature near the Delhi Monument on the ridge.

The Junter Munter, or Jeypore Rajah's Observatory. About a mile and a half on the Kootub Road.

Mausoleum of Sudder Jung. About five miles from the city on the road to the Kootub.

The Kootub Minar. Eleven miles from Kashmir Gate.

The "Iron Pillar." Close to the Kootub.

Togluckabad Fortress. Four miles east of the Kootub, and nearly ten miles south of Delhi.

Humaioon's Tomb.

Inderput Fort, situated on the Muttra Road, two miles from Delhi, is supposed* to have been built in the time of Joodish, 1400 B.C.

Hours of Despatch of Mails from Camp.

1st—At 9 A.M. for Calcutta and Down Country and Rajpootana, including Goorgaon, Rewari, &c.

2nd—At 2-30 P.M. for the Punjab, including Meerut, Saharunpore, Landour, and Roorkee.

3rd—At 6 P.M. for Bombay, Madras, Central Provinces, Oudh, and Down Country as far as Tirhoot. By Slow Train to the Punjab, Kurnaul, Hissar, Rohtuck, Bhowani, &c.

Hours of Delivery of Mails,

1st delivery at	...	7	A. M.
2nd ,, ,,	...	11-30	„
3rd ,, ,,	...	4	P. M.

* Cooper's Hand-Book.

The latest safe day for posting Overland letters is Friday, and the latest hour for receiving such letters, 9 A. M.

Letters for registration and parcels will be received daily—Sunday excepted—from 7 to 8 A. M., and from 12 noon to 5 P. M., and on Sunday from 7 to 8 A. M., and from 12 noon to 1 P. M.

Hours of Closing Mails in the City Post Offices.

Down Country, including Calcutta	...	.. 11-15 A. M.
„ including Madras, Bombay, and		
Central Provinces	...	... 7 P. M.
Punjab and all stations north	...	... 4-20 „
„ „ 2nd despatch...	...	... 7 „
Rajpootana, including Rewari, &c.	...	... 1 „
Other Mails to Kurnal, Rohtak, &c.	...	... 7 „



RULES FOR THE TRANSMISSION OF MESSAGES BY THE FIELD TELEGRAPHS.

1.—The office hours are from 7 A.M. to 5 P.M., except on Saturdays and holidays, when they are from 7 A.M. till 9 A.M. and from 3 P.M. till 5 P.M. Offices are closed on Sundays. [In very special cases messages may be sent at any time, but they must be marked *urgent*, and private messages sent at these times will be charged double rates.]

2.—Service telegrams between Field Offices will be sent free.

3.—Private telegrams between Field Offices will be charged for as follows:—

For officers, or soldiers, or officials attached to the Army—

10 words or less .. 8 Annas.

10 to 20 words .. 1 Rupee.

Additional 20 words, or fraction of 20 words, 1 Rupee.

The Address, free.

For all other persons, double the above rates.

4.—Telegrams, both service and private, which pass along both the Field Telegraph and Government lines, will be free of any field telegraph charge. For such messages despatched from a Field Office the usual amount charged at the forwarding Government Telegraph Office will be charged at the forwarding Field Office, a receipt being given for the amount paid.

5.—The telegraph operators, or officials attached to the Field Offices, have orders not to transmit messages which are not duly signed, and not to write out messages which they are required to send.

6.—The office messengers and orderlies are not allowed to receive answers to telegrams, or to take messages to the offices for despatch; and the operators are not allowed to send messages so received.

DELHI IMPERIAL RIFLE MEETING.

President of Committee of Management,

COLONEL W. GORDON, *Chief Inspector of Musketry.*

A SERIES of Rifle Matches will be held during the Imperial Assemblage, the details of which will be published in army orders.

The value and number of the prizes to be given will be determined hereafter.

The champions of the meeting, *i.e.*, the competitor who makes the highest aggregate score at 200, 500, and 600 yards in the Infantry, British and Native ; at 150, 300, and 400 yards in the British Cavalry and Royal Artillery ; and at 200 and 300 yards in the Native Cavalry, will receive "Empress Prizes."

Distribution of prizes as at Wimbledon, after conclusion of meeting.

1st day, Tuesday, 26th December 1876, for European Troops only.

2nd day, Wednesday, 27th ,, ,, Native ,,

3rd day, Thursday, 28th ,, ,, Native ,,

4th day, Friday 29th ,, ,, European ,,

All references regarding subscription rules, &c., or suggestions for the improvement of the programme, to be made to the Honorary Secretary, Captain J. T. Turner, 73rd Foot, Deputy Assistant Adjutant-General for Musketry.

All references regarding disposal of range, order of firing, ammunition, entrances, &c., to be made to Captain R. B. Reid, 2-12 Foot, Deputy Assistant Adjutant-General for Musketry.

RAILWAY TIME-TABLE DURING THE ASSEMBLAGE.

EAST INDIAN RAILWAY.

Mail Train, arr. at	Delhi	... 6-5 P. M.
,, ,, dep. from	,,	.. 11-30 A. M.

RAILWAY TIME-TABLE &c.—(*Continued.*)

Slow Passenger, arr. at	Delhi	..	7-35 A. M.
„ „ dep. from	„	..	10-50 P. M.
*No. 1 Up Passenger, arr. at	„	..	4-30 „
*No. 1 Down Passenger, dep. from	„	..	9-30 A. M.

S., P. AND D. RAILWAY.

Mail Train, arr. at	Delhi	..	..	12-50 P. M.
„ „ dep. from	„	..	..	4-50 „
Mixed „ arr. at	„	..	..	10-40 „
„ „ dep. from	„	..	..	7-40 A. M.
*Mixed „ arr. at	„	..	..	6-40 „
* „ „ dep. from	„	..	..	9-20 P. M.
†No. 15 Durbar Train, arr. at	Delhi	..	..	11-15 A. M.
† „ 18 „ „ dep. from	„	..	..	11-20 „

RAJPUTANA STATE RAILWAY.

Mail Train dep. from	Delhi	..	..	1-44 P. M.
„ „ arr. at	„	..	..	3-35 „
Mixed „ dep. from	„	..	..	12-50 A. M.
„ „ arr. at	„	..	..	2-49 „

ECCLESIASTICAL.

Services on Sundays (hours will be notified in Camp.)

Church of England.

Viceroy's Camp.—The Bishop of Madras, the Ven'ble the Arch-deacon of Calcutta, the Chaplain to the Bishop of Madras.
Cavy. and Arty. Division—Chaplain, the Rev. J. Adams, M.A.

* Extra trains put on for this and next month. Mixed trains are Passenger and Goods

† Nos. 15 and 18 are Special Trains only to run where necessary.

Two Infy. Divisions—Chaplain, the Rev. J. K. Stewart, M.A.
St. James's Church—Near Kashmir Gate (founded by the late Col. Skinner, C.B.)—Chaplain, the Rev. A. Horsburgh, M.A.
Sunday—Morning Service, 11 A. M. ; Evening Service, 5-30 P. M.

St. Stephen's Church—Opposite the Queen's Gardens (Church of England Mission S. P. G., founded by the Chaplain and residents of Delhi, 1852)—Clergy, Rev. R. B. Winter, M.A. ; Rev. Tarachund. Services in Urdu : Sunday Morning 8 A. M. ; Evening, 5 P. M. ; Daily, 4-45 P. M.

Church of Scotland.

Camp of 92nd Highlanders—Chaplain, the Rev. A. B. Watson.

Presbyterian, Wesleyan, Methodist, Baptist and Union Churches, &c.

Camp near Mobarik Bagh—The Rev. J. Gelson Gregson, the Rev. W. P. Morrison, M.A. Hours of Sunday service will be notified in camp. Temperance meetings will be held every week evening at 6 o'clock. All are invited.

Union Church Old Cantonment—The Rev. J. Fordyce,* the Rev. D. Rose,* the Rev. W. P. Morrison, Mr. J. Nelson, Lay Evangelist and others.

Methodist Episcopal Mission, Old Cantonment—Bishop Andrews* and the Rev. S. Knowles.

Baptist Church, Chandni Chouk—The Rev. Mr. Guyton. Medical Missionary, Dr. W. Carey.

Church of Rome.

Cavy. and Arty. Divisions—The Rev. Fr. Lewis.

Two Infy. Divisions—The Rev. Fr. Patrick.

St. Mary's Church, City—The Rev. Dr. Keegan. Sunday—Mass, 7 A. M. ; Vespers, 5-30 P. M.

Mr. Benjamin Simmonds—Colporteur. Anglo-Indian Christian Union.

* Address : Camp of Chief Commissioner of Oudh.

CIVIL MAGISTERIAL CHARGE OF CAMPS.

Captain A. Rennick.—Magisterial charge of all camps south and east of the Escape Canal. Resides near army head-quarters camp.

Captain G. E. Macpherson.—Magisterial charge of all camps west of the Escape Canal. Resides near Mobarik Bagh.

TROOPS IN THE FORT.

Col. (Mrs. and Miss) J. A. Angelo, royal artillery, commanding.

Capt. F. W. Macmullen, Station Staff.

No. 6 Battery 21st Brigade Royal Artillery.

Capt. R. A. Lanning.

Lieut. B. Duff.

Lieut. H. S. Dawkins.

Surg. J. B. Wilson, M.D.

Head-Quarters Half Battalion 62nd Foot.

Col. W. J. Chads.

Lieut. and Mrs. H. M. Carter.

Maj. G. Hay.

„ J. H. Bowhill.

Capt. and Mrs. J. L. Kelly.

„ J. F. Inglis.

„ G. S. Fraser.

„ F. C. Beatson.

„ R. N. Gream.

Sub-Lieut. S. C. Faulder.

„ H. Jones.

„ E. C. L. Clarke.

33rd Native Infantry.

Lt.-Col J. T. Harris, comdg.

Capt. J. G. Kelly.

Maj. T. W. Rutherford.

Lieut. J. H. Sadler.

Capt. S. C. MacTier.

Surg. E. R. Johnson.

Lieut. C. T. Bingham.

List of Visitors and Tradespeople living in detached Camps or in Houses.

Messrs. Cooke and Kelvey, Jewellers, Rajpur Road.

Mr. A. O'Meara, Surgeon, Dentist, camp, Rajpur Road.

Messrs. Bourne and Shepherd, Photographic Gallery, Rajpur Road.

Mr. T. T. Cooper.

Messrs. Cook and Co., stables west of Hindoo Rao's house.

„ Baker and Catliff, Alipur Road.

„ Goslett and Co., Mori Gate City.

„ R. Norton and Co., Rajpur Road.

Mr. W. Hill, Rajpur Road.

„ Percy G. Wood, United Service Hotel.

„ T. McMahon, Manager to C. T. Brock and Co.'s Fireworks, Fort.

„ J. Northam, Rajpur Road.

„ Nation, *Delhi Exchange*.

Messrs. Jamsetjee and Co., Chandni Chouk.

„ Hamilton and Co., Jewellers, United Service Hotel.

„ C. Glass and Co., Wine Merchants, next to Governor-General's Camp Post Office.

„ Meakin and Co., Brewers, next to Governor-General's Camp Post Office.

„ Ball, Hobson and Co.'s celebrated Umballa-made aerated waters—Agents, Goslett and Co., Mori Gate.

Mr. and Mrs. James

Miss Lawson

Mr. James, jr.

Mrs. Anderson

Miss Anderson

Mrs. Bruce

Miss Bruce

Mr. H. C. Radcliffe

„ and Mrs. Reckett

Miss Reckett

Canal Bungalow,
near Roshunara
Gardens.

Mrs. De Fountain, Restaurant, Volunteer Camp.

Mr. David Ross, Traffic Manager, S., P. and D. Railway, Delhi Station.

Maharaj Kumar Arjun Sing of Duttia, younger brother of Maharajah of Duttia in Urdu Bazaar, city.

ORDNANCE DEPOT.

Located in Fort Delhi.

Lieut. & Mrs. H. P. Willoughby, R.A., comsy. of ordn in charge.

Subordinate Officers.

Condr. E. Gorman.	Sub-Condr. J. Williams.
„ J. H. Smith.	„ T. Corrigan.
„ J Symington (special	Mag -Serjt. J. Delaney.
duty, Viceroy's camp.)	„ J. Brown.

Freemasonry at Delhi.

Lodge "Jumna" No. 1394 A. D. of 1872. (Lodge rooms above "Exchange" building city.) Meetings, 1st and 3rd Tuesday of every month. Master—Wor. Bro. R. M. Blaker.

Royal Arch Chapter "Chalmers." Meetings (as occasion requires).

VOLUNTEER BATTALION.

Nominal Roll of Officers.

Lieut.-Col. B. WALTON, Commanding.
Maj. FitzRoy Stephen, Rifle Brigade, Staff Officer.

Bangalore Rifle Volunteers.

Capt. Leonard.
Lieut. J. W. Hayes.

1st Punjab Volunteer Rifle Corps.

Capt. W. Trotter.
Lieut. F. Lightfoot.
„ W. Mellor.

2nd Punjab Volunteer Rifle Corps.

Maj. F. Peterson.	Capt. H. Kooke,	} Visitors.
Capt G. C. Caldecourt.	Lieut. R. Francis,	
Lieut, E. J. Chanter.	„ B. E. French,	
„ E. T. Anthony.	„ P. J. Coyne,	
	„ J. Phelps,	
	Sub-Lt. A. B. Wilson,	

Calcutta Volunteers.

Maj. R. C. Sterndale.	Lieut. H. Pratt.
Capt. J. Bruce.	„ J. T. Siddons.
„ F. G. Teale.	Qr.-Mr. H. Hallett.
Paymaster J. Binning.	Surg. J. Bourke.
Lieut. W. Clarke.	Lieut. and Adj. C. Roberts.
„ E. Lewis.	

E. I. Railway Volunteers.

Capt. J. Huntley.
Lieut. A. Langham.
„ A. Rendell.

Madras Volunteer Guard.
(*No information obtainable*).

Camp Restaurant.
Mrs. De Fountain.
~~~~~

CIVIL OFFICERS AT DELHI.

Col. W. G. Davies, comr.  
Mr. D. G. Barkley, addl. comr.  
,, T. W. Smyth, dy. comr.  
,, J. Frizelle, judl. asst.  
,, G. W. Parker, judge, s. c. c.  
,, E. Francis, asst. comr.  
,, O. Wood, dy. comr. of settl.  
,, J. Delmerick, treasy. officer.  
,, W. H. Davies, exe. engr., civil roads.  
The Rev. A. Horsburgh, chaplain.  
Surg.-Maj. Fairwether, civil surg.  
Mr. R. Thomson, asst. comr.  
Mr. Robert Clarke, asst. comr.  
~~~~~

ADDENDA.

Add to list of Visitors and Tradespeople.

Bank of Bengal, Mori Gate; Manager, J. Taylor.

Delhi and London Bank, Chandni Chouk; Manager, J. P. Phillips.

United Service Hotel, Mori Gate.

Northbrook Hotel, Mori Gate.

Messrs. Kellner and Co.'s Refreshment Rooms, E. I. Ry. Station.

Empress Hotel, Alipur Road.

Lord Lytton Hotel, City.

Mr. De Fountain's Restaurant, near Camp No. 5 Troops.

Mr. G. Fritschy, Photographer, Camp near Memorial Tower.

Messrs. M. L. Martin and Co., Emporium of Chinese and Japanese
Curiosities, &c., Hamilton Road, City.

Messrs. Wully Mahomed and Co., Hamilton Road, City.

Messrs J. B. Fielman and Co., Delhi Exchange Rooms.

Messrs. Brewer, Wills and Co., Engineers and Gas Suppliers.

C. Marcks & Co., Jewellers, Bombay.

Messrs. Henty and Co., at the Empress Hotel.

Mr. and Mrs. Penyston, at Lord Lytton's Hotel.

Messrs. E. Gillon and Co., at the Empress City Hotel.

The Skinner Family, in Skinner's house, City.

Captain Norman Horsford, with Capt. E. C. O. B. Horsford,
Punjab Police.

Lieutenant-General Henry Palmer, No. 1 Dariagunj, City.

Mr. Kipling, Principal, Lahore School of Arts.

Major Holroyd,

Mr. L. Probyn, C. S.,

„ C. W. W. Alexander,

„ C. Pearson,

„ and Mrs. H. A. Fenner,

Percy G. Wood, U. S. Hotel, City.

} Camp College compound.

No. 12, Daryaganj.

Surgeon.-Major J. C. Corbyn.
 Major and Mrs. Hervey, R.E.
 Captain R. P. Tickell, R.E.
 J. L. Tickell, Esq., Executive Engineer, Agra Canal.
 J. Monckton, Esq., Assistant Engineer, Agra Canal.
 H. Marsh, Esq., do. do.
 J. E. Cotton, Esq., do. W. J. Canal.
 C. Tickell, Esq., do. do.
 H. V. Colebrook, Esq., do. do.
 G. Cowper, Esq., Assistant Engineer, Holkar S. Railway.
 C. E. Day, Esq., do. Sirhind Canal.
 R. Molloy, Esq., do. do.
 R. Marsh, Esq., do. Meerut.
 W. Howe, Esq., Executive Engineer, Meerut.
 C. Perin, Esq., Assistant Engineer, Ganges Canal.
 R. H. D. Mills, Esq., do. E. J. Canal.
 E. A. Carswell, Esq., do. do.
 Lieutenant C. Hadden, R. A.
 R. Mullaly, Esq., Assistant Engineer, Sirhind Canal.
 R. A. Way, Esq., do. Rajputana S. Ry.
 F. R. Wynne, Esq., do. do.

Add to No. 16 Imperial Camp.

Dr. Warburton.

Dr. Joubert.

Add to Camp 18 Troops.

Miss Siddons.

Add to 5 Imperial Camp.

Under South Street, Right—Captain C. S. Beauchamp, R. E.
 A. B. Patterson, Esq., C. S., with A. Macmillan, Esq.

(c)

In 3 Camp Troops.

For Captain Anderson.

Read Major Anderson.

Add to G. Special.

Colonel H. F. Disbrowe, with Deputation of Muscat.

His Highness Syud Turki, the Imaum of Muscat.

Add to H. Special.

H. E. Sayyed Saeed, Representative of Sultan of Oman.

Add to Commander-in-Chief's Camp, No. 7. Imperial.

Major-General D. M. Stewart, C.B., in No. 7—Left, Centre Street.

Mrs. Pinkston and Miss Brown, rear of Centre Street—Right.

Add to page 21, under 10th Bengal Lancers.

Mrs. England.

Add to Visitors' Camp.

19M. Capt. Dudley Sampson, 9th B.C.

Maj. W. F. F. Gordon, 63rd Regt.

Dr. G. W. Leitner.

Mr. Randle Stainer.

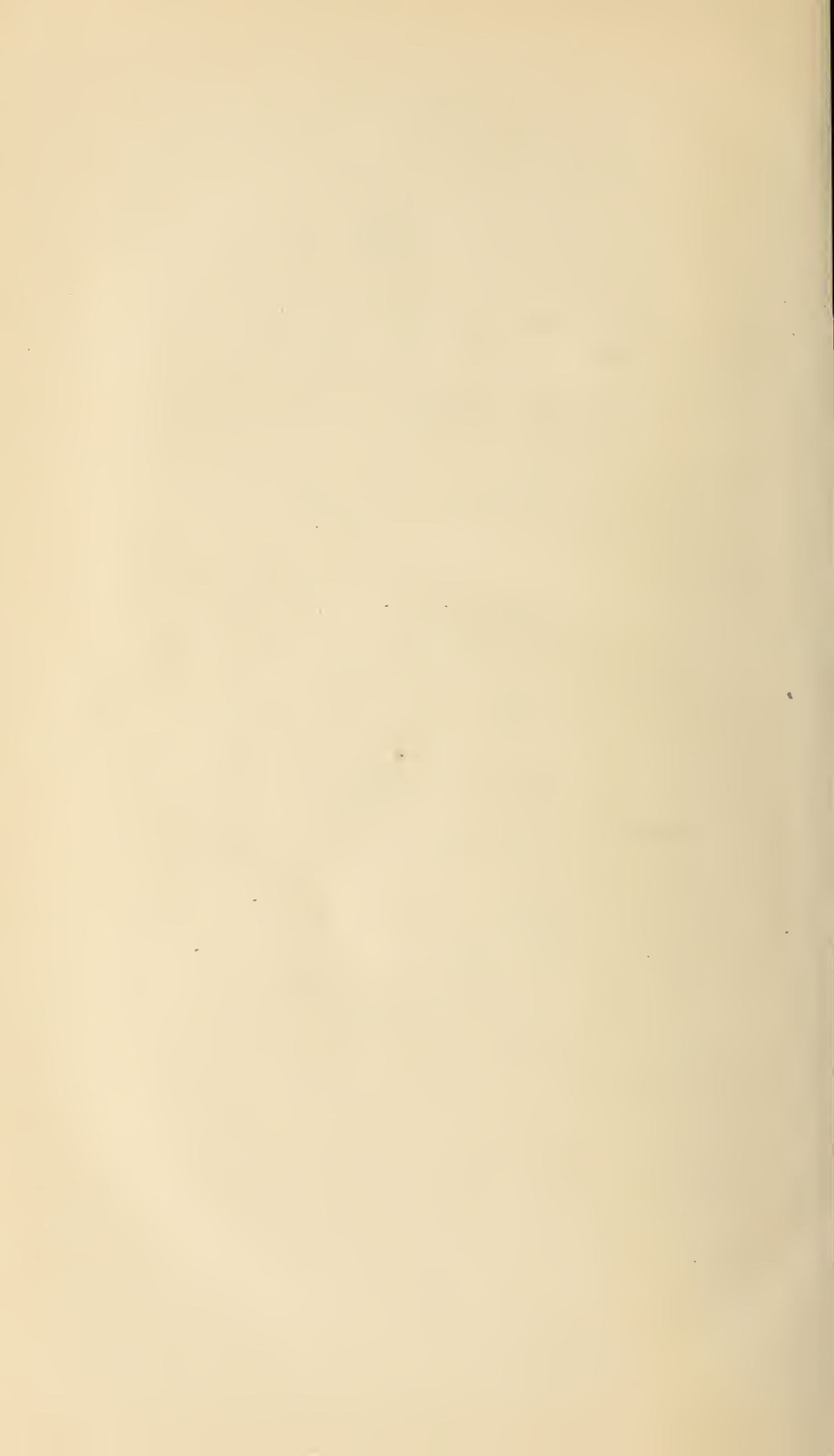
The Rev. Murray Aynsley.

Mr. R. Davidson, Judge, Chingleput, Madras.

„ Leonard Taylor, C.S., N.-W. P.

Maj. Warren, 65th.

A. J. Meiffre.



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NOTE.—Instead of pages the numbers and names of Camps are given in the Index, the following abbreviations being used: thus, “3T” signifies No. 3 Camp of the Troop Section; “7I” signifies No. 7 Camp of the Imperial Section; these can easily be referred to in the Directory, all Camps being arranged in consecutive order.

ABBREVIATIONS.—*I. Imperial (British). T. Troops. M. Miscellaneous. S. C. Special Native Camps. C. I. Central India Chiefs. R. Rajputana Chiefs. P. Punjab Chiefs. B. C. Bombay Chiefs. M. C. Madras Chiefs. B. Bengal Nobles. C. P. Central Provinces Chiefs. N. W. North-West Provinces Chiefs. O. T. Oudh Talukdars. Spl. Special. Pg. Page.*

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" Vety. Surg.	...	1I
Creg, R. W., Surg.-Maj.	...	6T
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ABBREVIATIONS.—*I. Imperial (British). T. Troops. M. Miscellaneous. S. C. Special Native Camps. C. I. Central India Chiefs. R. Rajputana Chiefs. P. Punjab Chiefs. B. C. Bombay Chiefs. M. C. Madras Chiefs. B. Bengal Nobles. C. P. Central Provinces Chiefs. N. W. North-West Provinces Chiefs. O. T. Oudh Talukdars. Spl. Special. Pg. Page.*

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Nacoda Mahomed Ali Rogay, Hon'ble	...	BC
Nandgaon, Rajah of	...	CP
Nana Ahir Rao	...	CP
Nana Chitnawur	...	CP

O.

Oomar Khan	...	1R
Oorcha (Tehri) Maharajah of...	...	5CI
Ondut Audoulah	...	MC

P.

Pawayan, Rajah of	...	NW
Pahasu, Nawab of	...	NW
Peesangun, Rajah of	...	14R
Pahar Sing	...	6CI
Panna, Maharajah of	...	12CI
Paldeo Chobey Unroth Sing	...	21CI
Piploda, Thakur Doobey Sing of	...	22CI
Partab Sing Rudr	...	OT
Purna Chandra Halder	...	7I
Pittapur, Zemindar of	...	MC

R.

Ram Mool Sing	...	6P
Raghubir Sing	...	3P

Raheem Buksh	...	3P
Ram Gopal	..	3P
Ruttun Sing	...	3P
Ram Sing	...	10P
Rampur, Nawab of	...	NW
Ram Pertab Sing	...	NW
Rajour, Rajah of	...	NW
Raj Gopal Dass	...	9R
Rao Rajah Seekur	...	13R
Rao Rajah of Doolah	...	13R
Rawal Beejey Sing	...	13R
Rao Rajah Kitree	...	13R
Rajgurrh, Rajah	..	14R
Ranaji Rao Scindia	...	1CI
Ram Rao Narain	...	2CI
R. Rugho nath Rao	...	2CI
Rai Nanuck Chund	...	2CI
Rewah, Maharajah of	...	4CI
Rundiman Sing	...	4CI
Rao Guneshjoo	...	5CI
Rao Simri	...	5CI
Ratlam, Rajah of	...	11CI
Radah Pershad Sing, Rajah	...	B
Roy Grish Chunder Das	...	1I
Ruthamajee Abaunckjee	...	14M
Bamdial Mull	...	4P
Rajpipla, Rajah of	...	BC
Ram Chunder Rao	...	CP
Raghoba Mohitia	...	CP
Ram Rao Kristna Rao	...	CP
Rameenger	..	MC
Rughoonath Narayen Rao	...	BC
Rao Bahadur G. H.	...	BC

S.

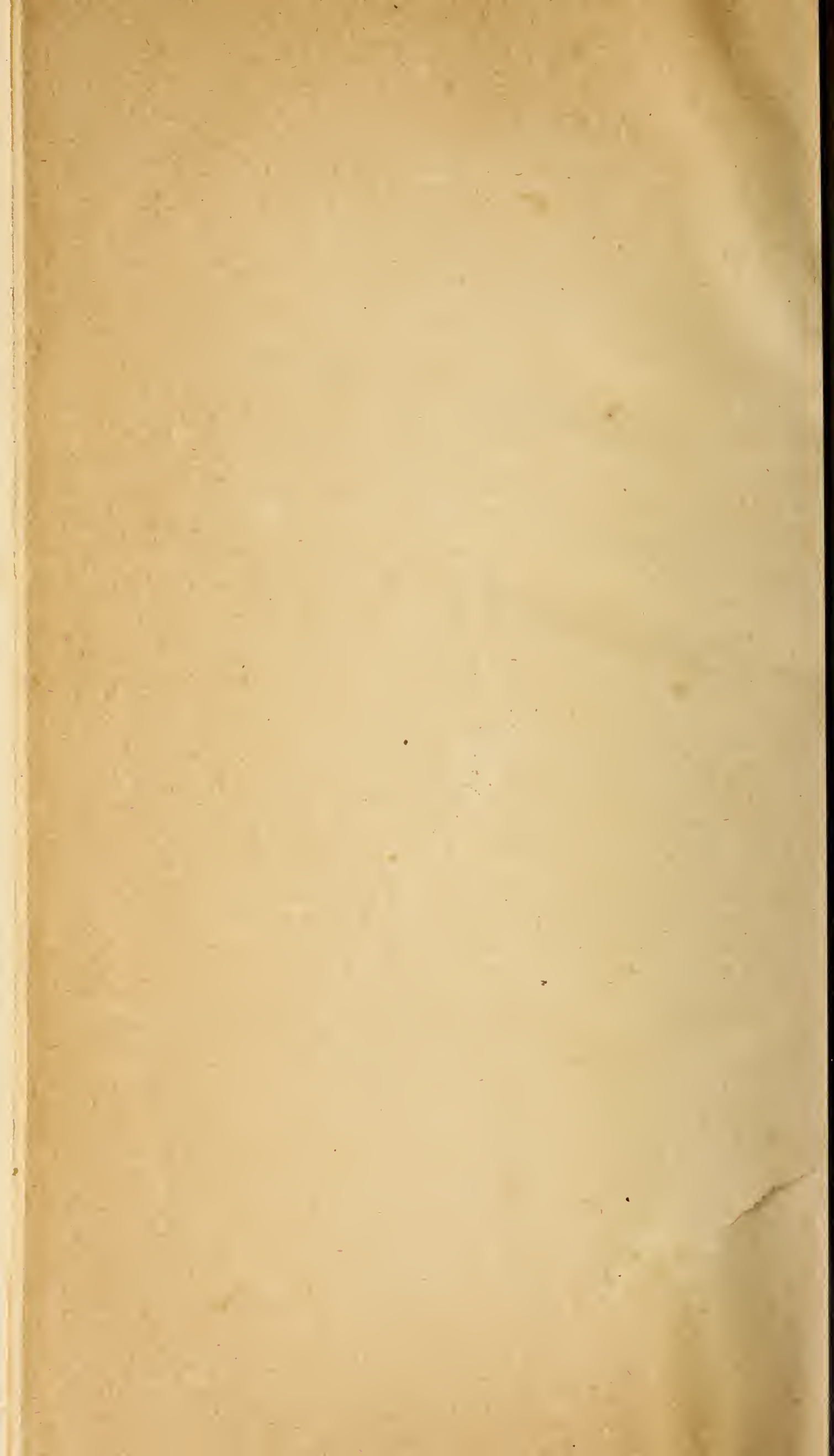
Sib Dial Sing, K. C. S. I., Sir		
Rajah	...	6P
Shapur, Shahzadah of	...	6P
Sarfaraz Khan	...	6P
Surat Sing	...	6P
Sher Khan	...	6P
Sher Muhammad Khan	...	6P
Shah Nawaz Khan	...	6P
Sahib Khan	...	6P
Sahib Sing	...	6P
Shumbunath	...	3P
Summunt Sing	...	3P
Surat Sing	...	8P
Suket, Rajah of	...	13P
Salar Jung, Sir, Nawab	...	ASpl
Sadut Ali Khan	...	ASpl
Siam Deputation	..	ESpl

Shiva Pershad, Rajah	...	NW
Sardhana, Nawab of	...	NW
Shiva Prasada, C. S. I.	...	NW
Shambu Narayan Sing, Rajah	...	NW
Sultan Sing, Thakur	...	6R
Sawar Thakur	...	14R
Sumeer Mull Seth	...	14R
Shunker Rao Gursod	...	1CI
Suntoba Dada Sahib	...	1CI
Shumshere Khan	...	1CI
Sukharam Martund, Col.	...	2CI
Sadik Hushein Khan	...	3CI
Sawai Kumedan	...	5CI
Sirdar Beg	...	5CI
Subdul Sing	...	6CI
Samphar, Rajah	...	9CI
Shahamat Ali Khan	...	11CI
Sheope shad Sing, Rajah	...	B
Sombursah, Rajah of	...	B
Suliman Kudr, Nawab	...	OT
Shankar Paksh	...	OT
Sher Bahadur Sing, Rajah	..	OT
Surabjit Sing Thakur	..	OT
Sarabjit Sing, of Tikooi	...	OT
Sitaram Seth	...	OT
Sahibzadah M. M-u-din, Attaché,	...	14I
Sher Shah	...	2P
Shaik Ferozedeem	...	2P
Sib Churn	...	1P
Sudur Sing	...	4P
Sham Sing	...	4P
Sudroodeem	...	4P
Shantaram Narayen	...	BC
Sonapur, Rajah of	...	CP
Suliman Shah, Rajah	..	CP
Shumboo Pershad Rao	...	BC

T.

Tehree (Gurhwa) Rajah	..	2NW
Tajpur, Rajah of	...	NW
Tamkulu, "	..	NW
Turjan Pal, Thakur	..	2R
Tonk, Nawab of	...	5R
Thakur of Oonarah	...	13R
Thakur of Nawalgurh	...	13R
Tatia Sahib	...	1CI
Takhat Sing	...	11CI
Toree, Jagirdar of	...	18CI
Trilokinath Sing	...	OT
Toliga, Rajah of	...	CP
Tanjore, Rani of	...	MC

U.		W.	
Uttam Sing	... 6P	Wazir Ali	... 4P
Umrao Sing	... 6P	Wishwanath Narayen Mandlick,	
Uttum Sing	... 3P	Hon'ble Rao	.. BC
Ummur Khan	... 3P		
Uttum Sing	... 7P		
Udaipur, Maharanee	... 8R		
Umletha, Maharajah of	... 11CI		
V.		Y.	
Vehridass, A., <i>alias</i> Bapu Sa-		Yekbal-ood-Dowlah	... ASpl
hib	... BC	Yadho Rao, Pandi	... CP
Vikar-ool, Oomrah	... A Spl	Yakub Khan, H. E.	... 5P
Vithul Rao, Scindia	... 1CI		
Visheshur Nath	... 10CI		
		Z.	
		Zenoo Deen	.. 1R



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